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THE

QUARTERLY JOURNAL

OF

ECONOMICS

MAY, 1919

THE RELATIONS OF RECENT PSYCHOLOGICAL DEVELOPMENTS TO ECONOMIC THEORY

SUMMARY

The purely objective factors in economics, 377. — Psychological principles necessarily used in addition, 381. — Social assumptions, 385. — Psychical factors are human motives, 387; their analysis needed for most social problems, 389. — Adequacy of psychology assumed in economic theory in dispute, 390. — Analysis of arguments pro and con, 392. — Hedonistic foundation, 394. — Costless production, 401. — Industrial peace, 404. — Sums of utility, 406. — Social demand, 407. — Institutional economics, 409. — Most accurate psychology needed, of producers' motives, 415; of consumers' demands, 419.

In spite of several attempts made in recent years to improve upon economic theory by renovating its psychology, economists in general do not perceive that psychological debates are relevant to economics. They have not been convinced that any real economic principles have been invalidated by the "new psychology" that has been exhibited to them, or that the latter promises any profitable extension of the body of economic theory.

It is said, for instance, that the generalized man assumed by our theory, who was supposed to pursue his economic interests in usually reasonable ways, must be

superseded by the real man known to modern psychologists, the creature of unreasoning hasty moods and propensities to heedless action. Well, what of it? is the reply. Granting that people's wants are determined frequently by instincts, and often by imprudent ones at that — what change does it necessitate in economic principles? We do not need to account for the origin of wants; our business is to study the means of satisfying them, and the conditions under which they may be satisfied. An ordinary degree of foresight with respect to these means does not seem to be such a far-fetched assumption. The other objections have seemed to be as easily met, and on the whole, in the hearts of most economic students, no conviction of sin has been awakened, altho the "psycho-economists" have been pressing their attacks, in different quarters, for over twenty-five years.

Some of the skeptics suspect that the trouble arises from too exclusive attention being given by the innovators to the subjective, or mental elements of economics, and from a preoccupation with the exceptional or abnormal cases even in that limited field. Results so obtained, of course, would hardly call for a revolutionizing of economic theory as a whole. It seems to the present writer that much of the criticism from the standpoint of modern psychology heretofore made by economists is inadequate, both as to psychological facts and their applications to economics, and the object herein is to make it clearer where the psychological discoveries and economic theory do fit together.[1] But let us at the very beginning safeguard ourselves against material fallacy by giving the purely physical factors of economics their

[1] The present writer is preparing a thesis in which questions of fact in psychology related to economics are considered. The discussion in the present paper, however, is concerned only with the place which psychological data have in economics, assuming them to be true.

due — those which are stubbornly indifferent to human thoughts or preferences. Then we may consider some ways in which psychical forces coöperate with these external facts to produce the activities we study.

Whether we like it or not, as Mill said, " a double quantity of labor will not raise on the same land a double quantity of food, unless some improvement takes place in the processes of cultivation." And the principle of diminishing quota of " overhead " expense to the unit of product, as volume of output increases (the basis of " increasing returns "), is likewise simply a way *things* have of acting. So is the pure fertility of the human species, with its enormous potentialities for the destruction of men's hopes. Whatever other factors may enter into the value of money, it seems clear that its quantity, by purely mechanical principles, must be a part of the explanation.

The superior productivity of labor which is specialized, moreover, and the gain in the efficiency of labor through saving and the use of tools or machinery, are not the projections of anyone's mind, tho we may choose either to regard or disregard these facts. But having once chosen, we must take the consequences, and cannot change the results by wishing. If we decide to do without the capitalists, and do not otherwise provide for the saving of wealth, our society as a whole will have perforce to work harder for its daily bread. The foregoing purely objective observations we recognize as economic principles which Adam Smith, Ricardo and Malthus elaborated and stressed; and these contributions at least, must not be included among the " tissue of false conclusions " which the classicists are supposed to have constructed from false psychological assumptions.

To illustrate further: The " law of variable proportions " is a name given to an external fact which shapes

the world's values no less than do the reason and passions of men — the fact that in most productive processes, an increased use of one ingredient, all others remaining stationary, will result in a larger total product, but in a lessening proportion to the units of the ingredient which is being increased. If you are smelting iron, or making shoes, or growing wheat, you will find that increasing applications of coal or leather or labor, the other factors in the processes remaining the same, will yield less and less increase in the output of pig iron or shoes or wheat. The most advantageous combinations are based on natural laws, or "habits of matter," which our technology takes increasing advantage of (through processes in part psychological) but cannot change. Under no conceivable social arrangements can the superabundant elements be made as valuable as the less abundant, or limiting, elements.

Without attempting to enumerate the special physical, mechanical, geographical or biological facts and uniformities which economic science must use as presuppositions, there is still another sense in which economic principles are independent of human volitions. Economic theory treats of means of economizing, or using without waste, the limited resources which nature affords to satisfy men's wants. Men usually try to get as much coat as possible out of their cloth, and economics gives them some information as to how to accomplish that result on a large scale. They can accomplish it only by acting reasonably, it is true. But suppose you can point out a group of people who have irrational and uneconomic ideas which they prefer to follow: does that prove the theory to be unreal and irrelevant to actual life? Let us see. The Indians of Paraguay, according to the account cited by Mill, sometimes killed for supper the oxen which the missionaries had given them; "thinking,

when reprehended, that they sufficiently excused themselves by saying they were hungry." [1] Their conduct was "natural" enough, but it was not "economic" — that is, it did not work economically. Since there are other peoples in the world who keep their oxen for work, and eventually need more land, there is every prospect that the Paraguayans will be eventually displaced by them. Hence the principles of economy are not exactly "idle tho true," even if not practiced by every one.[2]

But the foregoing instances of the purely objective subject-matter in economics must have called to mind several psychological principles which are closely associated with such physical data as these, throughout economic discussions. We are accustomed to think of the Malthusian law of animal fertility in connection with the theory of wages, an essential part of which is the doctrine that human self-restraint keeps population within the physiological maximum in practically every civilization. It may restrain the increase only to the point where a very scanty subsistence can be earned by each man, or it may under certain circumstances maintain a much better "standard of living" by placing a sufficient check upon reproduction. Besides this, every theory of wages must make several further psychological assumptions concerning the motives to work and to idleness, the relations of differences in wages between occupations and within occupations to maximum effort; the theory of human nature implied in the concept of non-competing groups; the effects of various wage systems and of scientific management; the mobility of labor, how affected by "non-economic" motives; and so on. If we assume that men will, in general, work as effectively for a smaller as for a larger wage, our con-

[1] Mill, Principles, Bk. I, chap. xi, § 3.

[2] See remarks by Professor T. N. Carver along this line in "The Behavioristic Man," Quarterly Journal of Economics, vol. xxxiii, pp. 195–199, November, 1918.

clusions will point toward the desirability of equal wages to all workers. In any treatment of labor problems and industrial peace, the other human nature elements are of course many and various.

Again, mention of the technical advantage of capital and the division of labor calls up many subtle discussions of the motives which induce and counteract saving, the "preference for present over future goods"; and we remember some questions about the motives which the business man has for buying the present goods, launching them into round-about production, and agreeing to pay interest. Some kind of subjective resistance against saving, which apparently has to be overcome by the payment of interest, has long been a fundamental assumption in economic theory; and most economists believe that the size of the anticipated business profits has something to do with the energy and shrewdness of the business man. It depends on our presupposition as to his motivation whether we consider his income above some wage standard as "earned" or as "rent" or "surplus."

And to the above assertion that external laws of nature prescribe the advantageous combinations of tools and labor, a "psycho-economist" might rejoin that these combinations are not to be taken for granted — they would never be realized but for human ingenuity, and that the currently accepted processes are in turn powerful institutions for molding the rising generation's ideas of natural law. It is true that invention, and the state and progress of the arts, are factors in wealth which the economist cannot help but take account of, and if he constructs any theory about them, it must be with the aid of psychological analysis. The "state of the arts" may for static purposes be assumed as an objective condition like the weather, but anyone who is inter-

ested in increasing social welfare and control over nature will not be content to stop there. He will ask how has progress in the arts been brought about in the past, and how can it be accelerated in the future? The patent monopoly system is based on a theory of inventive human nature; that men are more likely to contrive useful devices when they are assured of protection in reaping their benefits than when not. It was one of the projects Bentham thought most necessary for the improvement of human society.[1] Some modern theorists, with different presuppositions, class patent-monopoly gains as "unearned surplus" along with illegal monopoly gains. The question is, however, not solely what kind of motives actually control conduct, but partly, what kind of conduct controls the environmental factors most successfully.

It may even have seemed incorrect to speak of the "law of variable proportions" as a purely objective fact, so closely has it been connected in economics with the theory of value and the subjective elements thereof. The principle is referred to usually to show why the more abundant productive elements, of which more units would not make much difference in the output, inevitably have less value to the people who want the finished product than have the scarcer elements, of which more units would greatly increase the finished product. The laws of value are typical of that double dependence upon mental operations and physical conditions which characterizes so large a part of the subject-matter of economics. Altho scarcity of an object in the external world, relative to men's desires for it, is essential to its having economic value, yet such value is equally dependent on some one's wanting the object, and many of the actual phenomena of value are due to

[1] Jeremy Bentham, The Rationale of Reward (1830), p. 318.

differences in the intensity of wants which people have for different units of goods. The law of diminishing utility, a purely psychological postulate, giving greater precision to the tendency of exchange value of a commodity to decrease as the supply of the commodity is increased, has rendered very great service in economic analysis. If other equally regular principles could be discovered regarding the generation and mutations of the wants with which economic science starts, they might be equally useful, especially if we believe that a closer correspondence between actual consumers' wants and real needs is desirable.

When we proceed from utility to price, more psychology becomes necessary. Some further assumptions regarding the motives to competition and toward making provision for wants must be made. We usually assume the predominance of self-interest, so far as economic behavior is concerned; or we generalize that men strive to get the largest amount of material well-being for the least sacrifice; and of course we assume that men in general know their interests and the means of advancing them, in the existing state of the arts.[1] Wherever it appears that these conditions are not present, we make qualifications of the more general laws which do presuppose them.

There is one more group of subjects which illustrates the large part which presumptions as to motives play in economic investigations — the subjects of inheritance, monopoly profits, rents of natural agents, and differential gains of all kinds, with their related problems of taxation. Pure rent and monopoly gains are usually thought to be peculiarly fit objects of heavy taxation.

[1] See the discussion of premises in J. M. Keynes, Scope and Method of Economic Investigation, pp. 240–246; also chap. 4. The two assumptions just mentioned, along with the principle of diminishing utility, are considered the most important psychological postulates by the methodologists. Keynes mentions, however, a number of special problems where other psychical forces must be taken into account (pp. 129–134).

Why? Because the services for which they are paid are not the result of labor or saving on a competitive basis, and especially because heavy taxation will not lessen the supply of those services. The full amount which the traffic will bear need not necessarily be paid to the ownres of land or monopolies, in order that the community may get the fullest possible output. Herein seems to lie the vital distinction between such incomes and interest and wages. In dealing with the institution of inheritance, one of the chief questions is what rôle it occupies in inducing accumulation of wealth. The prospect of bestowing property upon one's descendants at his death is ordinarily supposed to be a strong motive for saving, and if estates were taken entire or taxed too heavily by the state, there would be less incentive to the owner to save, and more inducement to consume his property in his lifetime.

There is a third set of assumptions necessarily made by economic theory, not of physical or psychological laws, but of social facts having chiefly a mental origin; namely, the legal and social institutions, under which economic life is carried on. We must assume some kind of government which maintains order and enforces certain rules relating to property. What these rules are, may vary with different societies, and we may vary them in our hypotheses, with consequent variations in our conclusions. It is obvious that the production and distribution of wealth will take very different forms, according as distribution is on the basis of physical force, political competition, or economic competition under the institution of private property. The government, as Mill pointed out, might be considered a factor in production, since it is a labor-saving device. Hardly less pervasive in effect, through the " plane of competition " are the various customary codes of business and

professional ethics. All such institutions are human collective habits, based on unconscious custom or deliberate social will, and as we come to understand them better we are able consciously to modify them. The civil laws, of course, we are changing every day, and in the course of time the accumulation of such changes makes great differences in the economic situation. Custom and tradition are less amenable to voluntary refashioning, but "public opinion" can yet be influenced deliberately, by skilful appeal to popular sentiments.

Now, to consider the most probable effects on economic phenomena of the more plausible changes in governmental action, and in the other institutions which affect it, as well as conjectural changes in the arts, in population, and in the accumulation of capital, is the task of "dynamic theory" in economics.[1] The dynamic theory which considers institutional changes is obliged to pass some judgment as to the compatibility of such hypothetical innovations with human nature, of which more in detail later herein.

The foregoing, then, are some of the connections in which psychological postulates are used in economic theory. In this article we have not so far made any attempt to determine what are the most satisfactory psychological postulates in the various problems mentioned, nor have we attempted completeness of enumeration. The attempt was simply to make clear, by ample illustration, the point that many of the foundations of economic theory are secure against any possible fluctuations in the science of psychology; but nevertheless there are a number of the most important problems in theory which require psychological principles for their solution. We have thus tried to avoid the confusions

[1] See J. S. Mill, Principles, Bk. IV, chap. i; J. B. Clark, "The Future of Economic Theory," Quarterly Journal of Economics, vol. xiii, pp. 1–14 (1899), etc.

and errors which arise from any overestimation of either group of factors.

Another generalization may be hazarded. The psychology which is of use to economics is that which relates to the motives, or springs to human action.[1] In all the problems of theory we cited, the psychological assumptions were always as to what induces the human agent to work, to contrive, to save, to part with his goods. If we turn to the use of psychology in vocational economic fields, by the salesman, the advertiser, or the employment manager, we shall find it is the secret of arousing people to some kind of economic activity that is sought in each case. There are numerous technical problems subsidiary to motives, to be sure, with which the economist is concerned — the processes of choosing between one's wants, for instance, and of reasoning as to the means of satisfying those felt most urgently, or of arousing new wants in other people. But all these are included in the psychology of motives; and it is upon this psychology that we draw (from our own observations, or whatever other source) when we attack such problems as those in value and distribution which we have cited. Consequently it is only by adding significantly to our knowledge of motives that the psychologist can help us with our own theory; and here only so far as our explanations do imply certain incentives to economic conduct — not throughout the whole of economic theory.

Another useful preliminary will be a comparison of the terms "motive" and "cause." Since a motive may usually be described introspectively as an anticipation of a desired result, together with an apprehension of the causal sequence between some action in the agent's power and the desired end-effect, it seems that the

[1] Compare Professor Taussig, Principles, chap. 54.

future event in some sense *causes* the present action, and the ordinary temporal sequence between cause and effect is reversed. "Teleology" is apparently of a different order than "cause and effect," and in this distinction Professor Veblen has found an occasion for reading economics out of the ranks of the modern sciences. Its logic, he says, is that of "sufficient reason," and it has no room for the more pervasive law of causation.[1] This is to take what Professor Holt calls the "bead view" of causation, which has been discarded in physics — the view that cause and effect push one another along in fragments like marbles in a row.[2] The more accurate functional concept of causation is perfectly consistent with human purpose and foresight. The cause, in either case, is simply the object or process of which the other process (the human behavior) is some kind of constant (mathematical) function. The anticipated future satisfaction may be a part of the cause of today's labor, in that its realization is related to certain present signs which serve as the immediate stimulus to the laborer's activity. An unprejudiced view of motive, therefore, is the whole situation — that the man is prepared to execute some definite course of action with regard to some object or system of objects in his environment — his behavior is a function of that object.

An economic motive is one which results in behavior that affects wealth, or in economic activity; tho the wealth need not necessarily be the stimulus or even part of the stimulus. It is a commonplace, even in economic texts, that the economic motives are often very complex when one looks beyond the desire for wealth — we want a certain position not only for the larger salary, which will partly mean an easier time for our wife, but because

[1] T. Veblen, "The Limitations of Marginal Utility," Journal of Political Economy, vol. xvii, p. 633 (1909).

[2] E. B. Holt, The Freudian Wish (1915), pp. 157 ff.

we can live in the suburbs and appear to be getting on in the world and have Saturday afternoons off to play golf. Usually, possibly always, as economists we can safely shorten the expression and say "The man's motive is to make money"; but, as the writer hopes to show, the economist will gain numerous advantages from knowing as much as possible about the whole formula.

It is doubtless unnecessary to call attention here to the wider bearings which any real improvement of our knowledge of human nature has upon social welfare, altho it is hard to avoid being deceived by the abstract language of science into thinking of it as an "academic question." The economist, even tho he may have little taste for theory, will have no difficulty in visualizing behind the theoretical problems we have mentioned, such practical issues as tax systems, poor laws, judgments on trade policies, and all sorts of public regulations on business; such issues as state ownership of railroads or other means of production, and above all the old issue of collectivism or socialism. All these are argued partly upon rival theories of motivation, and in the question of socialism this element is especially large — what is constant and what is variable, and how is it variable, in human nature?[1] The competitive order is to be justified, if at all, upon the assumption that it provides the best stimulus to strenuous and economically directed efforts in that production of wealth which secures man's command over nature, at the same time providing the maximum of personal liberty. If that hypothesis is unsound, equal distribution must be the just one.

If we turn to the field of politics and government, we find questions of human nature as the inevitable legacy of Plato and his predecessors. Almost the chief problem

[1] See A. Wagner, Grundlegung der politischen Oekonomie, 3d ed. (1892), pp. 72 ff.

for schemes of international organization to keep the peace during the centuries has been — why do men fight? If we examine the fundamental differences of opinion in ethics and education, we shall find that most of them might be reconciled by an accurate knowledge of the original elements in motives, and the true principles of their development. At any rate, doubts would be removed as to the best *means* of increasing knowledge and moral or socially desirable behavior; while many of the apparent divergencies between the rival ultimate aims would probably disappear.

So far as psychology has really a place in economic theory, therefore, the results to which it leads us translate themselves into some of the gravest enterprises of life; and upon them the community does or should look to the economist for help. He is often despised, to be sure, as impractical, but he must comfort himself by the reflection that by investigations in "pure theory" time and effort are in the long run economized, because the undesirable results of some experiments which might be made in actual life (witness the Bolshevik laboratory) can be shown without the time and expense and misery of making the social experiment. It is about the same advantage that multiplication has over counting on the fingers — a short-cut through experiment.

The most severely practical man, of course, is a theorist, in that he constantly works with principles which he believes true without verifying them in every instance. The practical man, in deciding for himself what should be done about the railroads or some other problem, is guided by his working theory as to the general run of men's motives. If you ask him why he believes his own theory, he will say it is based on his own observation — he has not dealt with so many of his fellow-creatures for nothing. Doubtless there is much truth in this asser-

tion, but still, people do not realize how much the "common sense" of their time owes to the scholarly and advanced scientific views of a few generations before, which views are always, to a considerable extent, in harmony with everyday experience, but which are replaced by other philosophies that seem to account for still more of the facts. The conservation of matter and energy are common sense today, but in Priestley's time they were not. To a later generation the transmutation of elements may be common sense, founded on daily experience, as it was supposed to be in the days of the alchemists.

When we consider, then, the import which the real and elemental laws of human nature have (could they but be discovered) for our judgments and policies toward almost all our social institutions, we can better sympathize with the avidity with which both the lay and the scientific world seize upon any alleged discovery in psychology. The columns of stuff in the papers and magazines, and the somewhat more sober articles in the social science periodicals, applying in innumerable directions the teachings of James, McDougall, Freud, Binet and so on, are not to be ascribed merely to a fad. Many of them, no doubt, are improper applications of doctrines which in themselves are false; but such wide notice of these theories, purporting to explain human nature more accurately than had the philosophy or common sense of former generations, is perfectly justified by the great utility which more really accurate information on the subject would have.

We are concerned here with the importations of new psychology into economic theory. Our foregoing remarks as to the existence of a psychological content in theory and its implications are doubtless conceded to be true, if trite, but now we come to the real problems of

our paper. The issue is not, do we need *any* psychology, but do we need any *more* psychology, or any improvement on the psychology we are now using? "Some unsettled questions" are the following: Are the psychological assumptions which the prevailing economic theory makes sufficiently valid? Are they exemplified in the workings of real men's minds and in their choices; or, if not universally true, do they hold of a sufficiently large number of men to make them adequate for the economist's purposes? Or, if the assumptions now made are true as far as they go, can they be added to with profit to the science? More specifically, is there anything new in the science of psychology which necessitates, if true, any change in economic theory? If so, what is it and what changes does it imply? As was said at the beginning, many economists are unconvinced that such importations as have been made are necessary or useful.[1]

The course of the discussions on this point in economic literature is sufficiently well known so that the briefest chronological indication of it will be enough for present purposes. The German historical school began, soon after the middle of the nineteenth century, to dissent from the classical economists' assumption of self-interest in the pursuit of wealth as a general human characteristic, and they have gathered numerous adherents in other countries from that time to this. In the United States, after the marginal utility theory had been introduced, a discussion was started, apparently by President Hadley in 1894,[2] as to whether that theory, and perhaps

[1] See the vigorous review by A. C. Whitaker of Fetter's Economic Principles in Political Science Quarterly, vol. xxxi, pp. 430–444 (1916); and Professor Carver's brief article on "The Behavioristic Man" already cited; also citations of opinions that psychologizing is unnecessary for the economist in W. C. Mitchell's "Human Behavior and Economics," Quarterly Journal of Economics, November, 1914.

[2] A. T. Hadley, "Recent Tendencies in Economic Literature," Yale Review, November, 1894; H. W. Stuart, "The Hedonistic Interpretation of Subjective Value," Journal of Political Economy, vol. iv, pp. 64–84 (1895); Veblen, articles cited in next reference; Davenport, Value and Distribution (1908), and others.

the whole of economic theory, did not need considerable qualification or change of view, on account of the doubtful validity of its hedonistic psychological assumptions. Professor Veblen, in the later '90's and in subsequent years called the established body of economic science such names as "taxonomic" and "non-evolutionary" because of its alleged hedonistic psychology and teleological philosophy,[1] and he has during that time been demonstrating how "evolutionary" or "genetic" economics should be written.[2] In 1910 Professor W. C. Mitchell joined the attack on Veblen's lines, armed with the eminent English psychologist McDougall's dictum that "it would be a libel, not altogether devoid of truth, to say that the classical political economy was a tissue of false conclusions drawn from false psychological assumptions."[3] More recently there have been suggestions toward revamping economic theory by means of certain modern psychological principles from Professors Hobson, C. H. Parker, W. F. Ogburn, B. M. Anderson, Jr., C. H. Cooley, J. M. Clark, W. H. Hamilton and others. Professor Taussig[4] and some other eminent American theorists have recognized the important part which the psychology of instinct may play in certain economic phenomena — particularly in the contentment of industrial workers — but they have not seen that the cur-

[1] Thorstein Veblen, "Why Economics is not an Evolutionary Science," Quarterly Journal of Economics, vol. xii, pp. 373–397 (1898); "The Preconceptions of Economic Science," Quarterly Journal of Economics, vol. xiii, pp. 121–150, 396–426 (1899), and vol. xiv, pp. 240–269 (1900); "The Limitations of Marginal Utility," Journal of Political Economy, vol. xvii, pp. 620–636 (1909).

[2] Theory of the Leisure Class (1899); Theory of Business Enterprise (1904); Instinct of Workmanship (1913), etc.

[3] Quotation is from W. McDougall, Introduction to Social Psychology, 12th ed., p. 11 (1st ed. about 1908). Professor Mitchell's article was "The Rationality of Economic Activity," Journal of Political Economy, vol. xviii, pp. 97–113; 197–216 (1910). He has since written several articles on realistic psychology for economists. See his "Human Behavior and Economics: A Survey of Recent Literature," Quarterly Journal of Economics, vol. xxix, pp. 1–47 (1914), and "The Rôle of Money in Economic Theory," Proceedings of the American Economic Association (1915), pp. 140–161.

[4] Inventors and Moneymakers, 1915.

rent economic theory needed revision in the light of it. A number of still other writers, including Professor Marshall, have gradually changed their phraseology as to utility so as to avoid the implication of a hedonistic account of motivation.[1] Professor Fetter has done this with quite an air of reform, but neither he nor the others of this latter group have made any substantial change in the economic analysis as a result. The prevailing attitude seems to be that so far, no results of psychological research have been brought into economic discussion which call for any radical revision of theory; and therefore we will use our accepted psychological postulates, which are abundantly verified by everyday observation, until the psychologist brings forth in convincing fashion some revision of them which will make a real difference in our theory.

In order to determine whether this conclusion is correct, or whether it ends the matter until a properly accredited psychologist appears with some more significant discovery, it is necessary to make an analytical examination of the general drift of the main criticisms and of the replies which affirm that no revision of economic theory is needed. The present writer believes that grounds will be shown for a further inquiry into the psychology of motives in the interests of economics, and perhaps some irrelevant points of the criticism can be eliminated from further discussion. The criticisms (and replies to them) fall into about six counts, five of which are based on relatively "new" psychology.

1. *The Hedonistic Foundation.* — The first point of criticism is that the hedonistic conception of "utility," the assumption that pursuit of pleasure and avoidance of pain are men's fundamental motives, and the ac-

[1] See citations of changes in Mitchell's article, "The Rôle of Money in Economic Theory" above referred to.

companying presupposition that men customarily reason out the means available to them for securing pleasure and act so as to get the maximum of it, must all be thrown into the discard, because of the doom pronounced on them by psychology; and consequently economists should get a better psychological content to put into their place. On this point the critics have been agreed, tho they have gone on to very different points of reconstruction. Psychological hedonism has been under the fire of ethical writers for centuries, but the way its "explosion" came about in the science of psychology seems to have been about as follows: The instincts, animal and human, had long been studied and admired, but psychologists considered them unimportant in adult life until about the last quarter of the nineteenth century. Then several psychologists and biologists, notably William James and Jacques Loeb, began to attach much greater significance to these unlearned acts and reflexes as keys to psychological explanation. They also noticed the mechanical and automatic character of habit, and its pervasiveness in all human and animal conduct. By 1890 James is publishing his great *Principles of Psychology*, wherein he discourses on the number and characteristics of the instincts he believes men to use throughout life, and on the similar mechanisms of habit. The neural basis of "ideomotor action" is a little vague, but here, he thinks, is another source of spontaneous, unreflective actions. And so, in his chapter on the Will, after admitting the usual force of agreeableness and disagreeableness in promoting behavior, he says:

> So widespread and searching is this influence of pleasures and pains upon our movements that a premature philosophy has decided that these are our only spurs to action, and that wherever they seem to be absent, it is only because they are so far on among the "remoter" images that prompt the action that they are overlooked.
>
> This is a great mistake, however. Important as is the influence of pleasures and pains upon our movements, they are far from being

our only stimuli. With the manifestations of instinct and emotional expression, for example, they have absolutely nothing to do. Who smiles for the pleasure of smiling, or frowns for the pleasure of the frown? Who blushes to escape the discomfort of not blushing? Or who in anger, grief, or fear is actuated to the movements which he makes by the pleasures which they yield? In all these cases the movements are discharged fatally by the *vis a tergo* which the stimulus exerts upon a nervous system framed to respond in just that way. The objects of our rage, love, or terror, the occasions of our tears and smiles, whether they be present to our senses, or whether they be merely represented in idea, have this peculiar sort of impulsive power. The *impulsive quality* of mental states is an attribute behind which we cannot go. Some states of mind have more of it than others, some have it in this direction and some in that. Feelings of pleasure and pain have it, and perceptions and imaginations of fact have it, but neither have it exclusively or peculiarly. . . .

If in these our *first* acts pleasures and pains bear no part, as little do they bear in our last acts, or those artificially acquired performances which have become habitual. All the daily routine of life, our dressing and undressing, the coming and going from our work or carrying through of its various operations, is utterly without mental reference to pleasure and pain, except under rarely realized conditions. It is ideo-motor action. As I do not breathe for the pleasure of the breathing, but simply find that I *am* breathing, so I do not write for the pleasure of the writing, but simply because I have once begun, and being in a state of intellectual excitement which keeps venting itself in that way, find that I *am* writing still. . . .

Or what shall be said of a shy and unsociable man who receives point-blank an invitation to a small party? The thing is to him an abomination; but your presence exerts a compulsion on him, he can think of no excuse, and so says yes, cursing himself the while for what he does.[1]

No account need be given here of the development of these doctrines at the hands of McDougall, Thorndike, and others, for James's conception of instincts, emotions, habits as the prime movers to action, distinguishes the "functional psychology" which was the scientific basis of the economic critics' repudiation of hedonism. It is true that present-day psychologists do not use

[1] Principles of Psychology, 1890, vol. ii, chap. xxvi. Quotations made from the Briefer Course, pp. 445–447. As to the divorce of habit from pleasure-pain motivation, the same point is made by J. S. Mill, e. g., Logic, Bk. VI, chap. ii, § 4.

" pleasure " and " pain " in the inclusive sense of the older writers, since pain is now restricted to a definite sensation, coördinate with touch, taste, etc.; but the modern " feeling-tones " of pleasantness or unpleasantness, which coexist with most sensations, may be substituted without confusion for the older terms of pleasure and pain in discussions of motivation theory.

Now if instincts and habits cause human action in this unpremeditated way, and if the instincts are as various, and habit (or custom, fashion, etc.) are as omnipresent as these new psychologists represented, the critics reasoned, then it follows that man is not typically the rational being, acting for anticipated pleasant ends, that we had supposed him, and economic theory is seen to take a very incomplete view of the real process of economic behavior. This basis of criticism fitted in admirably with the agnostic views on business enterprise and consumption to which Professor Veblen had come from other angles, and so, by identifying the economist's concept of utility, sometimes with the consumer's personal " sensuous " gratifications, and sometimes with a broad social view of utility, he was enabled to argue in downright fashion that modern industrial activity, and especially business profits, bear little relation to the ultimate utilities which are being produced.[1]

Another objection to the hedonistic theory of motivation, which has been made by moralists from time immemorial, is based on the acknowledged existence of

[1] E. g., " The hedonistically presumed final purchase of consumable goods is habitually not contemplated in the pursuit of business enterprise. Business men habitually aspire to accumulate wealth in excess of the limits of practicable consumption, and the wealth so accumulated is not intended to be converted by a final transaction of purchase into consumable goods or sensations of consumption. . . . If, in fact, all the conventional relations and principles of pecuniary intercourse were subject to such a perpetually rationalised, calculating revision, so that each article of usage, appreciation, or procedure must approve itself *de novo* on hedonist grounds of sensuous expediency to all concerned at every move, it is not conceivable that the institutional fabric would last over night." Veblen, " The Limitations of Marginal Utility," Journal of Political Economy, vol. xvii, pp. 634, 636.

altruistic motives, in which the interests of other people than the agent, or the furtherance of some abstract ideal, are sought at the cost of the agent's own happiness. Economists are always reproached for their assumption of self-interest. But such objections are against the theory of universal egoism, not against universal psychological hedonism, and the two theories call for very different analyses. The man who sells all his goods to give to the poor may do so for the sake of the greater satisfaction or pleasure he obtains from doing it than he would from not doing it; or he may act in the same way impulsively, without the least thought as to how it will make him feel. What the external and social effects are, of egoism as compared with altruism, or the intermediate gradations, are of course open to non-psychological investigation. As Professor Carver says, there is little doubt whether the complete egoist or the partial egoist makes the better father and citizen,[1] but if we decided that we wanted to change people's motives in any respect, it would be useful to know something about the instincts or means of attachment of pleasure which make them act as they do.

The earlier attacks of the historical school on classical economics had been on the ground that the latter assumed a too universally selfish pursuit of wealth; their researches having shown that under other social institutions, other motives were stronger than this one is in modern commercial nations. This objection may best be considered later with another group relating to the effects of institutions.

The first effect of the psychological reaction against hedonism, above described, upon economic theory was criticism of the marginal utility theory of value.[2] Jevons

[1] Essays in Social Justice, chap. iii (1914); Principles of Political Economy, chap. iii (1918).

[2] See Hadley, op. cit.; Stuart, op. cit., etc.

had rubbed in the hedonistic calculus in his presentation of the value theory, and the Austrians and other adherents of the theory spoke, as a matter of course, of the "pleasures" and "satisfactions" which valuable goods mean. Nice calculations of small quantities of utility or pleasure also seemed rather essential to the theory. Hadley's qualification to these assumptions was based more on his own observations as to the number of unreflective, customary acts in every-day life than on new psychology, but the functional psychology increased the doubts as to the generality with which deliberate and careful valuations are made, such as the marginal utility theory seems to call for. The heroic lengths to which the search for improved psychology to sustain economic explanation could go, is illustrated by Professor Whitaker, who relates that an enthusiast seriously argued to him that the motor-car manufacturer puts stronger and softer springs on his machines, not because of the expected utilities to the consumers, but for the sake of his "entrepreneurial self-realization." [1]

It was easy to answer the objections at this stage, and to show the independence of value or other economic theories from any assumption that men merely seek pleasure and try to avoid pain. All we assume is that men want *goods*, concrete objects and services. There is no doubt about that; and we simply take whatever wants may happen to exist, as our motivation premises. Very likely people want shotguns because of their hunting instincts, and prayer rugs because of their superstitious customs, etc.; but whatever their wants are, some kind of material means, or wealth, are required to satisfy them. Likewise we observe that people learn what are the means for encompassing their desires; and,

[1] Op. cit., p. 430. Marion Parris in a Byrn Mawr thesis, "Total Utility and the Economic Judgment" (1909) criticises the psychology of economic theory from the self-realization point of view.

whatever the mental operations involved, they certainly do choose among their limited means so as to satisfy their most urgent wants. The ends may be instinctive or arbitrary, but the means are sought intelligently, economically. In the case of mechanically habitual acts, there was some deliberation at the time the habits were formed, and hence these were based originally upon preference among alternative courses. If the habits come to be unsuitable, through changes in the situation, and give strikingly uneconomic results, the agent is aroused to renewed deliberation and assertion of choice. Our theory is not dependent on any particular degree of rationality in the choices, nor on any special wisdom in the desires. Our "utilities" are not confined to sensuous satisfactions, nor yet to the wants which are ideal from the social point of view. The utilitarian psychologists and the classical economists never limited "pleasure" to sensuous personal bodily pleasure. All things which are in fact by mortals desired were considered pleasures by them, and their lists of desires read marvelously like the modern lists of instincts. The wants connected with ostentation, which Veblen has so well characterized, are amenable to our theorizing — in fact the critics themselves seem to consider these desires as among the strongest motives in the pursuit of wealth. As to rationality, we know that people usually are capable of following cause and effect in business far enough to see where they can get the most pay for what they have to sell. The kind of rationality which the critics accuse us of assuming is a complete knowledge of all facts in the universe, to which we plead not guilty.

As to our general theory of motivation, the reply goes on, all that economists ever needed to say is that most men try to get the largest possible amount of *wealth* for

the least cost, which assumption is borne out by observation, and has not been shaken by anything we have heard from psychology. No doubt some economists have said that men desire happiness or pleasure, but what we really presume is that men want wealth, which is the generalized means of realizing what wants as consumers they may have. In general, with regard to the qualifications of our assumptions necessitated by motives which do not express themselves in wealth-seeking, or by defects of knowledge of people's own interests, etc., these qualifications are usually such as cannot be reduced to any general principles, and the undue emphasis of them simply leads to agnosticism.

Therefore, say the defenders, the old, and rather convenient, hedonistic phraseology may be dropped from economics without impairing the validity of our analysis.[1] The present writer believes that modern psychological work, especially upon the "conditioned reflex," tends largely to validate the associationist and "hedonist" psychology, as well as to enlarge it; but that is a consideration beyond the scope of this paper.

2. *Costless Production.* — But these doubts reach deeper than the theory of value. They affect all problems of economic theory where principles of motivation are involved, especially those of distribution. The doctrine of motivation implicit in the classical and modern economics is that men in general seek the

[1] See Böhm-Bawerk, Positive Theorie des Kapitales, 3d ed. (1912), 2d half-volume, pp. 310–330, who answers the criticisms on value theory in this fashion; also Whitaker, op. cit., and Davenport, op. cit., who argue about as stated above. Marshall, Principles, Bk. I, chap. ii, explains the economist's treatment of motives similarly.

Most authors of economic principles, to be sure, do feel called on to give some account or analysis of the various human wants or motives, especially Continental writers. The Austrian Cuhel in 1907 published a fair-sized volume devoted to such classifications, explaining, as usual, that the ultimate force of wants is in the feelings of pain and pleasure. (Die Lehre von den Bedürfnissen, Theoretische Untersuchung über das Grensgebiet der Oekonomik und der Psychologie, Innsbruck, 1907, 310 pp.) Wagner's long analysis of economic human nature is still one of the best in any scientific treatise (op. cit., Bk. I, Pt. I, pp. 70–136).

largest material gain for the least sacrifice, and that their knowledge of ways and means is such that, on the whole, in competitive activity they do accomplish what they seek. Labor is irksome, and this irksomeness can be overcome only by threats or rewards. If it should turn out, however, that men are pushed into productive activity from behind, by their nature, fully as much as they are lured from the front by their pay, then our economic explanations lose considerable of their cogency as well as much of their accuracy.

The critics could admit most of the foregoing reply, and still maintain that the fall of hedonism necessitates substantial readjustments in economics. The next point of criticism accordingly is that men want, not only goods, but activity. Work itself is a utility to them. So that economics, in reasoning that production hangs on the wants for goods, is again telling no more than a half-truth. The power of instincts and custom, or public opinion, should be utilized for inducing production and saving at less cost to society. Inequality of wealth can thus be mitigated by the prevention of the large prizes from piling up on people who have already more than they need. Inventors, artists, patriots, leaders of industry would do their best work, even if they received only comfortable living wages; it is in their nature to put forth ceaseless activity in those directions, because their springs of action "are wound up that way."[1] How absurd, then, to let them accumulate and dissipate big fortunes, because of their luck in possessing aptitudes which are worth so much to their fellow-men. Even the multitude of us, who do not have such full and free creative bent, do a great many things in which we have no pleasure or even would gladly avoid, just be-

[1] See Taussig, Inventors and Moneymakers, for a statement, tho not a defense, of this theory.

cause we don't want to seem "queer." We could be kept doing our best by public opinion and our own sense of good will, without being paid according to the pieces of work we turn out. Most of our capital, in modern times, is accumulated automatically, both by rich and poor, without conscious reference to the rate of interest. Hence modern psychology points the way to means of stopping the "rent" or "surplus" of natural ability or involuntary saving from going to people who do not require it to induce their contributions of services.[1] Such suggestions, of course, are common among socialists.

The reply is that *part* of the supply society wants, either of work or of saving, would doubtless be forthcoming if there were less reward than at present, or none at all; but not the whole amount would be had. It is true that some fish are caught and some chopping of wood done, just for the "fun" of the occupations; and much other production could be motivated by less reward than the producers get now. But the output of these enthusiasts would not go far toward supplying the whole community; in order to get the full amount desired, it is necessary to pay all producers or all savers the rate which we have to pay the most reluctant one. The most effective way we know to increase our stock of wheat or coal or pork, even in war-time, or to get loans to finance the war, is to offer a higher price for all units of the supply, tho that means abnormal gains to some producers. As to taking such differential gains by taxation, we can do that when the differences are due to differing expenses of production; but where the differences are in personal ability or diligence, it is impracti-

[1] Substantially this is the argument of J. A. Hobson, Work and Wealth: A Human Valuation (1914). Other theorists who believe capital is accumulated automatically do not usually draw the above inference, but it is inevitable. See Taussig, review of Kleene's Profit and Wages, Quarterly Journal of Economics, August, 1917.

cable if not unjust to bribe the unworldly performer less than the grasping one.[1]

Another line of reply is that if you subsidized these various artists with a comfortable living regardless of their products there would be no assurance that they would devote their talents to works that other people most wanted. When their subsistence depends on the salability of their products the resulting activity may be distasteful to the artists but it is more certain to satisfy the wants of a number of their fellow-beings.

3. *Industrial Peace.* — A recent variation in the application of the instinct psychology to economics, one which brings to bear the Freudian teachings, is the warning that economists should consider the effect of forms of industry upon the workers' fundamental instincts. When the work stifles these instincts and baffles their free expression, as for instance the specialized routine of semi-automatic machines defeats the attendants' creative bent, then the baffled impulses force their expression in violent outbursts, inattention, rebelliousness, sabotage.. Workaday tasks may thus be the causes of innumerable nervous afflictions such as Freud has studied, leading to various forms of mania. It was contended that the waves of strikes and industrial unrest in the years 1915 and 1916 might be accounted for along these lines. If economists acquainted themselves with the nature of the important human instincts, therefore, they could give better advice on labor problems.[2] In similar fashion, other elements in the economic situation

[1] See Professor T. N. Carver, "The Behavioristic Man," Quarterly Journal of Economics, vol. xxxiii, pp. 195–199 (1918); and "The Place of Abstinence in the Theory of Interest," ibid., vol. viii, pp. 40–61 (1893); also Professor J. M. Clark, "Hobson's Work and Wealth," review, Quarterly Journal of Economics, November, 1914. Marshall, Principles (6th ed.) Bk. IV, chap. iii, §§ 5 and 6, notes the existence of surplus to certain savers and laborers.

[2] See Carleton H. Parker, "Motives in Economic Life," Proceedings of American Economic Association, 1917, pp. 212–231.

might be considered as to their effects on people's instincts, in an estimate of their contribution to human welfare.

The answer is that such investigations are doubtless important, but they fall only to a very limited extent within the scope of economic theory. Economics must not be confused with the whole of social science and art, and as to the recent industrial unrest, we may believe that rising prices had a good deal to do with it.[1] Economists hardly need to be told now that there is no one specifically economic motive, and that the relations of employers and laborers are concerned with many other human factors than the rate of wages, but it is believed that this is a special phase of economic investigation which must be studied empirically.[2] The connection of the psychology of instincts with these problems, however, has been given attention by two of the most eminent American economists, outside their general treatises [3] and the presentation of it to the business and labor world is assured by students of labor problems.[4] Another prominent economist has published his own theory of the psychology of instinct and emotion, with side-views at the Freudian doctrines, without as yet drawing any social applications.[5]

Provided the instinct theories on which these labor welfare views are based hold their own in the psychological world, there is every reason to believe that a large and useful body of knowledge will arise, which may in

[1] Fetter, Discussion of Parker's paper, Proceedings of American Economic Association, 1917, pp. 231 ff.

[2] E. g., Keynes, op. cit., chap. iv, § 3, and R. F. Hoxie's Trade Unionism in the United States, reviewed by Ordway Tead, Journal of Political Economy, vol. xxvi, p. 763 (1918).

[3] F. W. Taussig, Inventors and Moneymakers (1915); Irving Fisher, "Health and War," Presidential Address, American Association for Labor Legislation, 1918.

[4] See the recent book by Ordway Tead, Instincts in Industry (1918), which was inspired by Professor Parker's teachings.

[5] Simon N. Patten, "The Mechanism of Mind," Annals of American Academy of Political and Social Science, vol. lxxi, pp. 202–215 (May, 1917).

time find its place in economic theory. It is in too nebulous a state to do so now.

4. *Sums of utility misleading.* — Another criticism of the current economic theory from a psychological standpoint, which is not based especially upon new discoveries, is an accusation that many of the current statements of the marginal utility value theory are inconsistent with the psychology presupposed by that theory. We refer to the expositions relating to sums of utility, and the transition from individual utility scales to general demand schedules. Upon the principle of diminishing utility, the contemporary inequality of incomes among different people makes it impossible to assume that equal money demands in the market for commodities represent equal utilities to the various people who are demanding. Five dollars offered by a millionaire for a poodle's collar does not approach the utility of five dollars worth of flour to a laborer. So long as the discussions are confined to subjective *utility* schedules, or to general money *demand* schedules, the value theory is satisfactory to this critic; but when the notion is smuggled in that the dollars in the general demand schedules represent equal marginal increments of utility, and the inference is suggested that the present competitive system directs productive agents into making the goods which have greatest utility to the whole community, the critic does strenuously object. If incomes were equal, production would be turned away from collars for poodles and private yachts, and the multitude of expensive luxuries, toward things which have greater utility to poorer people. Cultivation by economists of realistic psychology would cause them to avoid any degree of speaking in such fashion.[1]

[1] See B. M. Anderson, Jr., and the writers he mentions: Social Value (1911), esp. chap. 5, and The Value of Money (1917). Cf. P. G. Wright, "Total Utility and Consumers' Surplus under Varying Conditions of the Distribution of Income," Quarterly Journal of Economics, vol. xxxi, pp. 307–318 (1917).

It is admitted that differences of wealth do, indeed, prevent us from arguing that competitive distribution necessarily gives maximum satisfaction,[1] but, since usually money events affect the various social classes in about equal proportions, a general correlation between dollars and utilities may be assumed. And, looking beyond the mere satisfaction of consumption to the motivation which it involves, we may find that the poodle's collar induces more productive effort for society in general than does the barrel of flour in the poor man's home. If it happened that a great manufacturer wanted an expensive and nearly useless summer home, and, if he could not have it, would rest on his oars instead of scheming how to make motor cars or shoes cheaper, the community as a whole may derive great utility from that summer house, through the services it motivates.

5. *Social Character of Demand.* — Returning to criticisms based upon non-hedonistic psychology, we find a line of social psychology criticism. This has its roots in the phenomena of instinct and habit, above alluded to; for tho the name "social psychology" embraces many wonderful doctrines, the chief terms of their explanations are inborn propensities and the power of custom to influence individual action. Imitation, suggestion, tradition, fashion, sympathy, emulation and the like are the entities we meet, and they are classified and pedigreed according to the author's apprehension of the fundamental tendencies. By means of these original or instinctive structures in the individual's mental apparatus, the psychic lives of all members of a society interact and mutually determine one another. The principles so worked out by social psychologists are used in this case to account for the stability and inertia

[1] E. g., Marshall, Principles (6th ed.), Bk. V, chap. xiii, § 5. Cf. ibid., Bk. I, chap. ii, § 3; and Bk. III, chap. vi, § 3.

of economic demands, and more particularly to make the point that demands are instilled into the single person by the group of people whose lives in any way touch his. Demands for economic goods are instilled partly through the moral, legal or aesthetic "values," which are swayed, in any individual, by the whole thought of his group. The extent of rational action by the individual, with reference to the actual effect of material goods upon his personal welfare may also be discounted on the same grounds. The supposition that the individual best knows his own interests, and the means of realizing them, tends to be discarded. Sometimes the assertion is made that a man's choices and behavior are entirely at the mercy of the social and material environment into which he happens to be born.[1]

The criticism is then made that the prevailing economic theory is based on a monadistic psychology; each consumer developing his own wants independently, and carrying them about in a suggestion-proof container; and it therefore considers social phenomena as the mere summation of individual choices. But the single person's choices are so swayed, even in the marketplace, by suggestion, by what he thinks other people want, that we must consider market value to be a social choice; the value set upon goods by the whole interacting social mind. This conception is supposed to account for sudden variations in objective or market

[1] "Scientific knowledge of mental and physical health . . . is undermining the idea that each individual is the best judge of his own desires . . . [the individual] can make nothing out of the world that the world does not first make out of him; he cannot even desire of the world, save as it has taught him to desire. He is limited by the range of stimuli that have come within his experience. He is at the mercy of whatever system he happens to be born into for creating, transmitting and directing stimuli. The slum tenement, the hill farm, the school, the church, the newspaper, the advertisement . . . all are parts of this system which determines men by determining the stimuli to which they are exposed." J. M. Clark, "Economics and Modern Psychology," Journal of Political Economy, vol. xxvi, pp. 6, 11 (1918). Professor B. M. Anderson also teaches that "the individual" is a misleading conception, since he is so largely a social product. The writings of Professor C. H. Cooley on social psychology have been very influential in impressing this point on a group of American economists.

values, in panics, booms, fashion epochs, which are incomprehensible in terms of the little units each calculating private utilities.[1]

Moreover, it is said, since the influence of deliberate suggestion is so strong in molding demands (witness the various businesses of promotion, salesmanship and advertising), economics needs a "theory of economic guidance," or of direction of wants, showing how actual wants may be made to coincide with real social needs.[2] Of course such a theory of guidance must be based on the best attainable social psychology.

The reply to this line of criticism is that such social influences affect economic values and behavior, only through the objective choices of individuals, and they are thereby brought within the range of ordinary value theory.[3] Suggestibility may be a powerful agent in determining choice; tho doubtless much of the so-called suggestion is merely enlightenment as to opportunities for securing satisfactions. No one doubts that choice depends upon knowledge of the means of getting utilities. It is questioned if the mature person's wants (which are those affecting economic matters) are as much the prey of suggestion, or if the ordinary man is as much of a jellyfish, as the critics make out. As to the guidance of wants, religious and moral leaders have always made that their business, and they will undoubtedly use the best psychological light they can get.

6. *Institutional Economics.* — We are now better able to appreciate the nature of Professor Veblen's criticism, made twenty years ago and repeated at inter-

[1] B. M. Anderson, Jr., books cited, and "Price-Fixing and War Finance," Proceedings of the American Economic Association, 1917, pp. 240–242.

[2] The second, or constructive, part of Professor J. M. Clark's paper cited above, on "Economics and Modern Psychology," outlines a "theory of economic guidance." Journal of Political Economy, vol. xxvi, pp. 136–166.

[3] See R. B. Perry, "Economic Value and Moral Value," Quarterly Journal of Economics, May, 1916.

vals since, that economics is "non-evolutionary" and "taxonomic"; and also the more modern demand for an "institutional economics." Veblen's arguments are never easy to follow: these on genetic economic theory seem to be among his most obscure. And the papers of Professor W. C. Mitchell,[1] making much the same arguments, tho clearer, are not generally well understood. Since the preliminary step of this line of objections is to accuse current economic theory of hedonism, the latter's defenders have considered themselves done when they proved their independence, by showing that they assume only the facts of choice, and care nothing as to why the choices are made.

Veblen admits, however, the effectiveness of the current theory for most of the purposes to which it is so far put. What he says to us in effect is this:[2] You are doing fairly well what you undertake to do, in spite of your bad psychology, but you are not undertaking enough. Your theory shows how whatever choices happen to exist, work themselves out in the modern business world, taking all its conventions and arts for granted. The hedonistic manner of calculating utilities happens to be much the same as the business style of calculating profits, especially in the processes of production (tho the scheme has little exemplification in consumption), and so you have not gone so far wrong as you might have in a science of business.

But with your old hedonistic preconceptions you will never get any further than things as you find them. Any predictions you make as to the effects on economic phenomena of certain arbitrarily supposed states of the arts or social or governmental conditions (for example,

[1] Especially "The Rationality of Economic Activity," Journal of Political Economy, vol. xviii, pp. 97–113, 197–216 (1910).

[2] See his three articles cited above: "Preconceptions," "Economics not an Evolutionary Science" and "Limitations of Marginal Utility."

different institutions as to property), are well-nigh worthless because you suppose men primitively and intrinsically to be the shrewd and rational economizers that you find in the modern down-town office. Your conjectural history of savages swapping nuts and apples according to marginal utility calculations, and your expositions of economic principles in terms of psychic income, are the fruits of this delusion. If you had cultivated better psychology and anthropology, you would know that people's decisions are not determined, except within very wide limits, by considerations of the primitive or absolute pleasure pain utilities, or by unbiased reasoning as to the properties of external goods in relation to men's wants. The "facts of choice" at any time depend chiefly upon men's native instincts interplaying with the great body of customs and current technology and common-sense philosophy that have been handed down to them; above all by the kind of prowess held in most esteem. The very capacity for reasoning and calculating in economic affairs, which you suppose to be innate, is the product of the more refined perceptions of economic cause and effect that are made possible by the use of money.

You admit that our constant associations with money values in business life cause us generally to think obviously expensive things more beautiful than inexpensive things, and to pay more respect to wealthy neighbors than to poor ones. We are constantly buying things we don't need because we find them going at a bargain. Yet you fail to see how manifold are the other ways that our culture colors and directs our ways of thinking. The technical processes you see about you, the government and business usages now in vogue, came about in some way that you leave to others to explain, and into them you fit your cunning welfare-desiring

savage. And you suppose that into any future society, under other laws, *mores* and arts of workmanship, the men of that time would bring the same processes of valuation, the same enthusiasms and utilities, the same standards of what is reasonable and efficient and worth while that the men of today possess.

The upshot of it all is that your help in guiding the community's economic affairs will never begin to realize its possibilities until you reach a more complete understanding of economic activity; which understanding must include a knowledge, derived partly from modern psychology and anthropology, of how institutions and the basic instincts mold the industrial routine, and how the latter becomes in its turn an institution which helps to mold the mind of the rising generation. This is the cumulative sequence or evolution in economics, comparable to the evolution which other modern sciences study in their fields.[1]

In some respects, the historical school's criticism of classical economics was in this same vein — alleging an underestimation of the force of custom, convention and other motives beside that of making the most money for the least effort. Knies said that universal altruism was as valid an hypothesis as universal egoism; and Frederic Harrison in England reminded the classicists that

> In vast permanent societies in long ages of history, populations such as the Egyptian and Indian, under a strict caste system have shewn an astonishing degree of industry, directly stimulated by habit, social feeling and religious duty; and in a very slight degree by personal desire of gain. In religious societies, under very different kinds of faith, very active industry on a scale quite decisive as an experiment has been stimulated by purely religious motives. Some of the most splendid results of industry ever recorded — the

[1] Professor W. H. Hamilton has also argued that theory should take this turn. See his "The Price System and Social Policy," and "The Place of Value Theory in Economics," Journal of Political Economy, vol. xxvi, pp. 31–68, 395–400 (1918). Professor J. M. Clark's article above quoted leans in the same direction. W. Sombart's work is a partly theoretical account of the evolution of capitalism.

clearing of wildernesses; vast public works such as bridges, monuments and temples; the training of whole races of savages into habits of toil — have been accomplished by purely religious motives by monks, missionaries and priests.[1]

Opposed to such persuasions is the contention (substantially that made by Mill) that our great aim at present is to analyze the economic order we are now living in, with human nature as we know it. This task is sufficient to occupy us for some time, and it is more important than is worrying about what primitive man may or may not have done.[2] Whoever understands the economic forces at work in our own day will not have difficulty in deciphering those in other forms of society. Our assumptions, of men's efforts to get the greatest wealth for the least sacrifice, rationality in the application of means to this end, diminishing utility, etc., are sufficiently true of the general run of people in the modern states; and we have not had to wait on the development of the whole formula of economic progress before being able to give quite helpful advice upon such things as railroad rates, the currency and the tariff. That ambitious enterprise, the complete theory of economic development, will come when more is known about the whole process of social development; our present theory will undoubtedly fit into it quite as well as Veblen's demonstrations of genetic economics.

It is further urged, on the other hand, that the current theory is already an evolutionary theory, since the long-run survival of a nation depends upon its material progress, and since economic science throws light on the

[1] Quoted in Keynes, op. cit., note, pp. 133, 134.

Another Lewis Carroll might, indeed, work out a system of economics based on the assumption of universal and complete altruism, exhibiting the "trust" as a benevolent institution for relieving unfortunates of the root of all evil, and representing bargaining as a process of accommodating the other fellow by taking off his hands the care of his possessions.

[2] J. S. Mill, Logic, Bk. V, chap. ix, § 3; T. N. Carver, Distribution of Wealth, Introduction; J. M. Keynes, op. cit., pp. 166 ff.

most reasonable and efficient use of limited natural resources. It does not matter so much what any people's actual instincts or wants are, as that they manage to control their impulses, and act more efficiently than their competitors. Reasonableness is a great weapon of survival, in the natural selection of peoples. Granted that large societies have existed at various times, built on religious or customary motives, where are those societies now? They are not inheriting the world as are the peoples who have adopted the system of competitive liberalism. Rationality may be partly a product of social evolution, but from this time on, any group that tries irrational variations will do it at their peril.[1] The same sort of reasoning vindicates the assumption of moderate self-preference in the pursuit of wealth, aside from the overwhelming testimony of observation that in business dealings practically all men do want to make as much money as they can.

So much for the main lines of criticism on psychological grounds. The plausibility of the replies shows at once that psychologizing is not so imperative for the economist as it is sometimes represented. The hedonistic explanations which were formerly used by the classicists, and by nearly all economists until recently, are seen to be unessential to the economic theories they were supposed to have supported, and they have been dropped from recent writings, without damage to the economic doctrines themselves — at least in their static aspects. We can take as our ultimate data on the side of demand the "facts of choice," which account for the values of different goods, and assume through our own societies a universal moderate degree of self-preference in the accumulation of wealth (which, on account of its

[1] See Carver, "The Behavioristic Man," cited above. Cf. Walter Bagehot, "Preliminaries of Political Economy," in Economic Studies, p. 80 (1880).

interchangeability, satisfies the most diverse instincts and habits), and we need not inquire further into the psychological principles which determine that the choices shall be what they are. The pleasure and pain phrases were perhaps consciously used by the older writers just for purposes of convenient exposition, not for premises of investigation; in any case, the supposedly "first principles" of any science are likely to be less secure than its body of more particular propositions, because the former are usually formulated long after the latter.

Nevertheless the psychology of motivation may with advantage be cultivated by economists for the following reasons:

Altho the *process* of valuation which the marginal utility theory describes doubtless does not depend upon the causes of the ultimate choices, yet that process is a purely psychological one, and the economist's account of it should be in close harmony with the psychologist's conception.

Moreover, the great theorems of distribution, and even of production, as we have indicated, contain predictions as to human motivation which give them much of their significance. It may be that these predictions are also independent of the reasons for ultimate choices, but let us, for illustration, examine the connection of the psychology of motives with the specific productivity doctrine in its most general form. Veblen calls this "a theory of valuation, and hence only of distribution," but it is a partial theory of production also, since it tells why land and labor are devoted to producing certain things, wheat, for instance, and not certain others, ragweed, for instance.

The specific productivity theory is often criticized on the ground that it confounds the right of appropriation,

under certain property assumptions, with the principle of physical causation. To show that, under free competition and private property, the owner of one of the scarcer necessary elements in production can *appropriate* a larger share of the product than the owner of one of the more abundant, is not to show that the total product was physically *produced* by the joint elements in the ratios which their remunerations bear to one another. As Professor Clark admits, when you get down to one man sawing wood, it is hard to apportion responsibility for the cutting between the man and the saw. Water is as necessary to the fattening of a hog as is corn, but in the specific productivity formula, the increased weight is produced by the corn alone. And so on.

But such criticisms arise from unfortunate statements of the theory. What its proponents mean is, that the consumers who want more of any product, say of pork, are not so much concerned with the physics and chemistry of the fattening process as they are with finding what factor is, by its scarcity, holding up production, and with securing more of that factor. If we can get more corn, we shall have more pork; no more corn or similar feed, no more pork, tho we get oceans of water. Economically, the corn is the one thing necessary, the economic cause, if you like, of the larger amount of pork we want. For this reason we are willing to give up something valuable to get more corn, whatever may be our social institutions; but we will not pay anything for more water. In this way, any part of the utility of the finished product may be imputed to the elements necessary to produce it, according to their relative scarcity.

But is its utility the only reason why we *pay* more for the corn than for the water? So far as our society is

rational, it is not. If neither supply can be changed by human efforts, there is no good reason for allowing an owner to appropriate the corn and charge us for it what the traffic will bear. We expect to pay higher for the scarcer materials in most cases because the supply can be increased by human efforts, and because those efforts will be more strenuous, the higher the pay. And these efforts will be directed to producing the materials which are scarcest, relative to the needs for them, because for such will the highest rewards be offered. That seems to be the common sense of the specific productivity theory. It is of little significance aside from its theory of motivation.

In order that it may be used to justify private property and free competition to the fullest extent, on the ground that under these institutions the community's productive resources automatically are devoted to supplying the goods which are most urgently wanted, it is necessary to assume that the larger money offer always means the greater human want. What qualifications of this assumption may be necessary is a psychological question, as we have seen.

But in order that the theory may have any social interest at all, the assumption must be made that the more pay you offer men for a given product, the more of that product they will manage to supply you. This is the "utilitarian" theory of motivation. The propounders of specific productivity usually apply this theory of motivation to human, as well as material agents, assuming that a relatively high level of wages in any occupation attracts numbers of workers into that occupation, by means of larger families within its ranks, or by greater efforts among members of other ranks to give their children or themselves the necessary training to enter the first, until equality of wages between occu-

pations is secured. Of course the "utilitarian" theory of human motivation is not the peculiar property of the specific productivity theorists, it is assumed in all the most important explanations and advices given by economists of all persuasions. There is no doubt that it is sufficiently life-like in modern society to make our explanations in the main sound. But if there are psychological possibilities of withholding an "unproductive surplus" which it is not necessary to pay, to induce certain personal services, as critics claim, that is worth looking into. We now admit rather generally that there may be more economical methods (to society) for inducing the services of natural agents and monopolies than that of paying the owners who have been allowed to appropriate them, according to the full marginal utility of the agents' services; and perhaps the same principle might apply to capital and to the rarer personal abilities — if there really are no marginal savers, and if the creative impulses are so strong.

Of course we may be convinced that the "utilitarian" assumption is true of the race of men we know, and of that which the world has always known. For purely static purposes we may take it as a "fact of choice," and refuse any psychological ministrations from the institutional economists, with their jargon of "pecuniary culture," "prescriptive authority," etc. Yet we are rather intrepid if we project such assumptions into the future, and insist that psychological research can never throw light on the question of what human nature might become under other institutions than those of the present or of the past. It may be there is no possibility of other perfectibility in mankind than in knowledge, which will be used in the service of cunning, but if we have any appreciation of the strength of custom and public opinion, we shall want to consider the psychol-

ogists' dissections of habit and instinct, in our estimate of the future.[1]

A multitude of dynamic propositions at once more immediately feasible and more fundamental for social improvement, however, await upon a better knowledge of human nature than economists generally now possess. Such are those involving education of consumers' demands, the stimulation of productive effort, and the avoidance of standards of consumption which are futile or harmful. If all people chose spontaneously to spend their incomes in the directions which are, in the long run, most beneficial to themselves and everybody else, the millennium would be realized under the competitive order. All would work out according to the specific productivity ideal. And likewise in a collectivist society production and saving would be ultimately determined by consumers' (voters') demands, and so the millennium in this case too depends upon better standards of consumption. Very likely the luxurious demands of the rich would not divert so much productive power away from necessities in such a state; but most of us, socialists as well as liberalists, will admit that the masses' individual demands need considerable improvement. If we desire — not necessarily as economists, but as men having the social welfare at heart — to do some-

[1] The Comtean "hierarchy of science" supplies an interesting side-light at this point. The sciences, as Comte showed, may be arrayed in simple to complex order, corresponding to the relations subsisting in their subject-matter. If we start with the mathematical and logical sciences as the "lower," and proceed through the physical, biological, psychological and social sciences, we shall notice that each science for its completion presupposes most, if not all, of the results of all the other sciences "below" it, but none of the laws of sciences "above" it. We believe that neither Comte nor anyone else ever supposed that much fruitful and exact work in any of these fields must await upon any particular degree of completion of the simpler fields; but it is useful to remember this relationship, which signifies that any well-authenticated discovery in a simpler field, which is inconsistent with an assumption in one of the more complex, makes necessary the revision of the latter so as to harmonise with the former. Psychology, for example, must adjust itself to all facts of the physiology of nervous tissue.

This application of the Comtean formula was made by Richard Jennings, in his Natural Elements of Political Economy, London, 1855.

thing effectual toward improving consumers' demands, we shall learn what we can about the psychology of wants. We shall go to the roots of customs, institutions and the other social influences, and by understanding the source and extent of their power over us, shall learn to harness that power toward making nature supply more freely the materials for realizing our ideals. Such study may not be economics, but it is certainly part of the social physiology which must be developed before social medical treatment can be most efficiently administered. It is one of the fundamentals of the theory of welfare as related to wealth, which nearly all economists feel bound somehow to consider.

The suggestion mentioned above, that current theory is sufficiently dynamic, because it simply works out principles of reasonable and economical use of resources, which must be conformed to if the group is not to be ousted from the world by another group which does conform to them, must be borne in mind lest we make our theories too comfortably humanistic by overlooking the stonewalls of fact which we are about to bump our heads against. Altho correspondence to existing human nature is not the last criterion of economic theory, yet human nature is one of the elements which our active adaptive process has to work with, in adjusting our society to its physical environment. The best possible institutions (which we may have some hand in framing) must have a double adjustment — to the nature of man and to the nature of the physical universe. Our bodily structures also may not be as adaptive as those of some of our competitors, but in order to improve them, we must know the principles upon which they are organized.

And so our tentative conclusion is that an accurate knowledge of the psychology involved in economic behavior is needed in economic theory, not so much for

static as for dynamic purposes. It is needed for static theory if we want to be assured that our static theory is as complete and fundamental an explanation as the existing state of knowledge permits. But it is vital for dynamic theory, which looks beyond the existing conditions of wants, social structures and industrial devices, and prophesies what *would be* the result of various supposed innovations, if they were made. In this same fashion we have long predicted the probable results of hypothetical taxes and tariffs on production, distribution, etc. If we can set up hypotheses as to ways of changing consumers' demands, or producers' springs to action, which psychological science shows to be plausible, and trace their effect on economic life, we shall be adding to the purely scientific theorems which the legislator or reformer may find helpful. And aside from the possible applications to pure economic theory, such knowledge of motives is bound to be useful in the practice of social art.

Z. CLARK DICKINSON.

CAMBRIDGE, MASS.

LATIN AMERICAN FOREIGN EXCHANGE AND INTERNATIONAL BALANCES DURING THE WAR

SUMMARY

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I. The Exchange Situation

To the student of international trade the experiences of Latin America during the war offer interesting material for analysis. Especially interesting is the course of foreign exchange. Exchange has fluctuated with a violence that would be impossible in normal times; and the fluctuations have occurred in response to commercial and financial changes particularly significant for these "young countries," whose business of making a living consists chiefly in exchanging their raw produce for foreign manufactures, and whose capital is obtained almost entirely by foreign borrowings.

So abnormal did the exchange situation become in the later stages of the war that in some cases "credit-exchange" agreements were resorted to at the solicita-

tion of the United States and the Allies. In January, 1918, Argentina entered into a "Grain Convention" with Great Britain and France, whereby a credit of $200,000,000 was granted to those nations to finance the purchase of 2,500,000 tons of Argentine wheat of the 1917–18 harvest. Shortly afterwards a similar credit fund was extended by Argentina to the United States, for $40,000,000. In February, 1918 the Uruguayan congress sanctioned a credit of $15,000,000 to Great Britain; and in July, one of $20,000,000 to the United States.[1]

These various "credit-exchange" conventions had as their main purpose the stabilization of exchange without resort to gold shipments. Their general character may be shown by a brief description of the arrangement between Argentina and the United States. By way of a beginning, we may recall the basic principle of the exchange mechanism as it operates in normal times: that, in response to the conditions of demand for and supply of bills of exchange (represented respectively by those who owe payments abroad, and those who receive payments from abroad), exchange fluctuates within the narrow limits of the "gold points," and cannot depart farther from par, for the reason that with the rate at specie point it becomes cheaper to make or receive payment (as the case may be) in gold, including cost of carriage overseas, than by bill of exchange. Gold thus flows out of or into the given country according as exchange is at the gold export point (unfavorable to importers and other debtors to the outside world) or at gold import point (unfavorable to exporters and other creditors of the outside world). Such, very baldly, is the mechanism in peace times. But the United States government was at war, and had placed an embargo on the

[1] A similiar arrangement between the United States and Chile was under discussion last summer, but was not put into operation.

export of gold; so that the delicate mechanism of the gold points was upset. Thereafter, the fluctuations of the rate of exchange became much wider and more violent, being governed wholly by the conditions of supply of and demand for bills, without the possibility of gold movements to relieve the pressure on the rate. In the case of Argentina the rate had risen to a figure such that the peso was at a premium of about 13 per cent over the dollar; and this for the reason, as we shall see more fully later, that Argentina had a large balance of international payments due to her, and therefore an excessive supply of bills offered for sale in the Buenos Aires market. Further purchases of Argentine exports would increase that supply of bills, and drive the rate still higher. How relieve the pressure and force the rate back toward its normal level without resorting to gold shipments?

The following system was devised. The New York importer who bought goods in Argentina was permitted to settle by giving a check upon his New York bank to the Federal Reserve Bank, which sold him an order for pesos payable in Buenos Aires. The Argentine government, through the Banco de la Nación, lent to our government (i. e., to the Federal Reserve Bank) the required pesos, delivered in Buenos Aires, to pay the bill to the Argentine exporter. The Banco de la Nación agreed not to draw upon the Federal Reserve Bank during the period of the credit-exchange arrangement, but to content itself with allowing its credit to grow. This arrangement was to continue until the credit had grown to $40,000,000 (later increased to $100,000,000). Thus, the New York importer paid his debt (to the Federal Reserve Bank), the Argentine exporter received payment (in paper pesos issued to him by the Banco de la Nación); and no remittances, whether of gold or of

bills of exchange, took place between the two countries. But our government owed to the Argentine government a growing debt, to be paid off after the war, in gold or in goods; and to make that payment it had the sums received from our importers. In other words, for the duration of the agreement the whole process of paying for our Argentine imports ceased to be a foreign exchange transaction at all, or rather, as it has been commonly put, it became a "credit-exchange" transaction. Argentina exchanged that part of her exports which exceeded her imports for a credit, to be paid off at a future date. By this arrangement the excessive supply of exchange, represented by the exports, was withdrawn from the exchange market, which almost immediately fell markedly in the direction of the par rate.

Our present interest is not in the credit-exchange arrangements themselves, but in the abnormal situation which made them necessary. They have been described, very briefly, merely as a means of setting forth some aspects of that situation, and of the forces which underlay it. The purpose of this paper is to compare the course of foreign exchange in the four leading South American countries — Argentina, Brazil, Chile, and Uruguay — during the war; and to study some of the chief commercial and financial changes responsible therefor. The accompanying chart will serve as a starting point for the discussion.

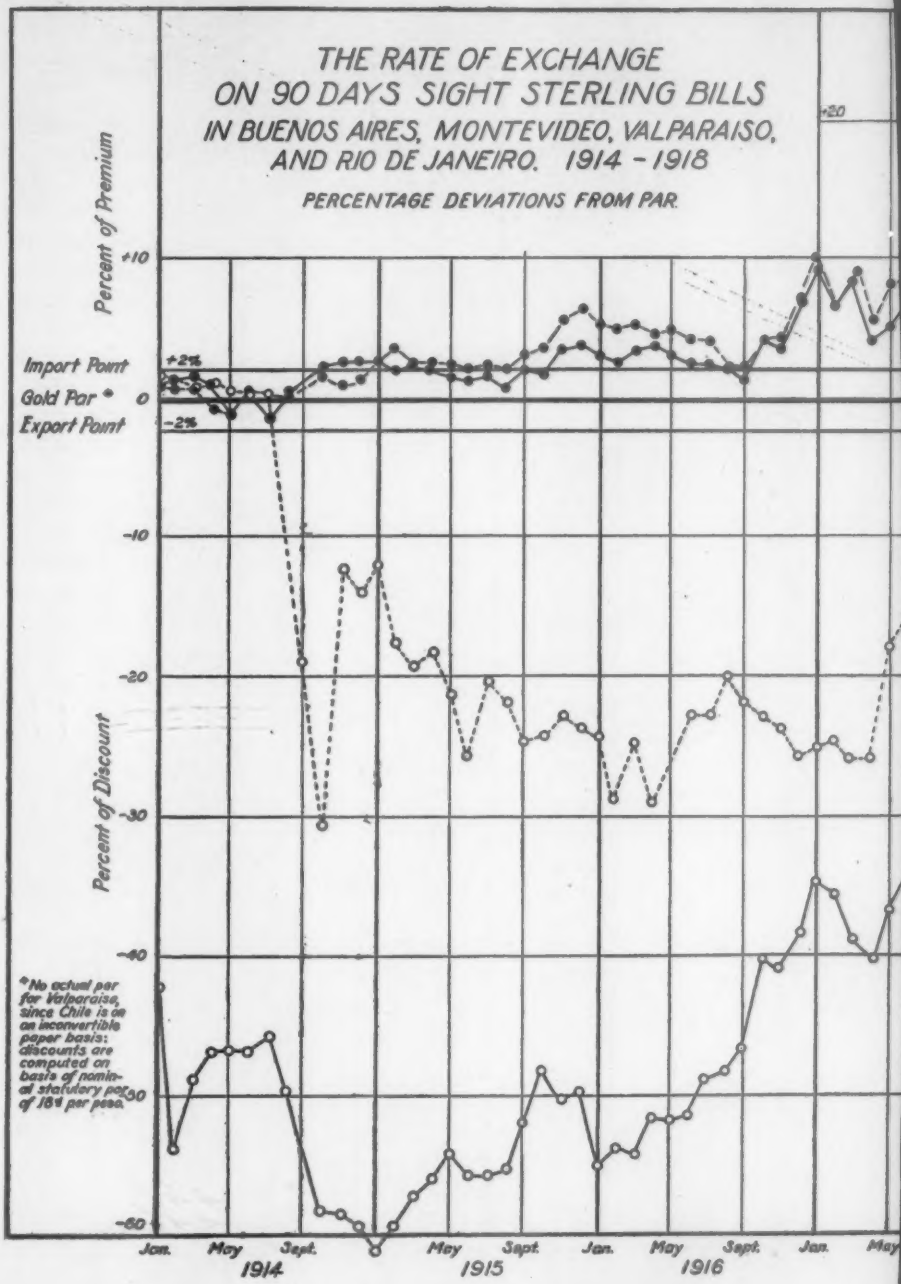
The chart compares the course of exchange on 90-day sight sterling bills in the four countries named, for the period 1914–18. To render the fluctuations of the four curves comparable with each other, the actual quotations for each country, averaged for each month, are expressed in terms of their percentage deviations from the mint par of exchange between the gold currency unit of the country in question and British currency. In

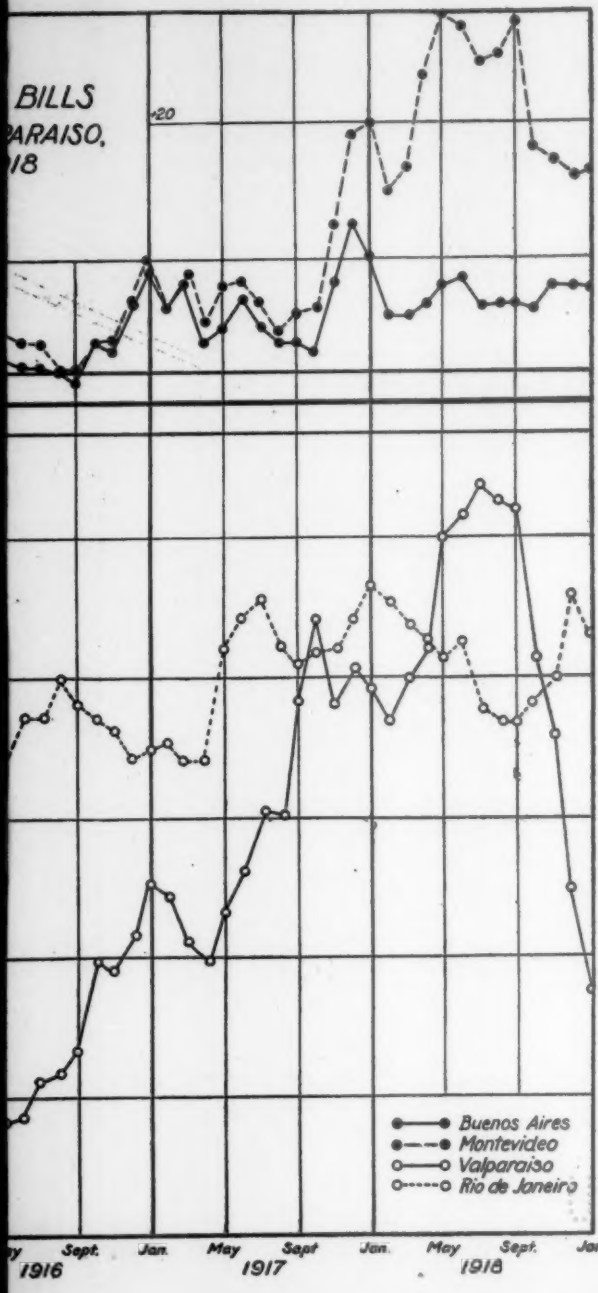
Latin American countries sterling exchange is quoted in British pence, the par of exchange being 47.58*d.* per Argentine peso, 16*d.* per Brazilian milreis, and 51*d.* per Uruguayan peso. In the case of Chile, as will be described more fully later, the par of exchange, 18*d.*, is merely "nominal" since the law declaring the value of the peso to be 18*d.* is inoperative, the currency of the country being in fact depreciated inconvertible paper.

As an indication of the degree of abnormality of the exchange fluctuations, the "gold points," within whose limits the rates of exchange fluctuate in normal times, are drawn on either side of the par line. Since the margin between the par of exchange and the gold import and export points is not the same in any two countries, varying, among other factors, with the distance (and consequent freight costs) between the exchanging countries, ample margins have been allowed, + 2 per cent (premium) being taken as the gold import point, and −2 per cent (discount) as the gold export point.[1]

It is at once apparent that in all four countries exchange departed widely from the usual limits. The mechanism of gold points broke down completely. Even the Buenos Aires exchange, which shows the least violent dislocation, rose in December, 1918, to about 54*d.*, a premium of 13 per cent. Montevideo exchange rose as high as 65¼*d.*, in May, 1918, a premium of 28 per cent. Brazilian exchange, on the other hand, depreciated, falling as low as 11½*d.* in October, 1914 (a discount of 31 per cent), and fluctuating since that date

[1] Throughout this paper the terms "premium" and "discount" have reference to the monetary units of the South American countries under discussion, and not to British currency. Exchange being quoted in British pence, a rise of the rate means that more pence must be offered for the peso, or the milreis as the case may be. In other words, a rise above par signifies a discount on sterling, and a premium on the peso. Contrariwise, a fall below par means a premium on sterling and a discount on the peso. The rise and fall of the Latin American sterling exchanges, therefore, are to be interpreted in just the contrary way from the rise and fall of sterling exchange in New York. Since the New York quotations are in United States currency, a rise signifies a discount on the dollar, and a fall a premium on the dollar.


THE RATE OF EXCHANGE
ON 90 DAYS SIGHT STERLING BILLS
IN BUENOS AIRES, MONTEVIDEO, VALPARAISO,
AND RIO DE JANEIRO. 1914 - 1918
PERCENTAGE DEVIATIONS FROM PAR
Percent of Premium
Percent of Discount
+20
+10
+2%
Import Point
Gold Par * 0
Export Point
-2%
-10
-20
-30
-40
-50
-60
*No actual par for Valparaise, since Chile is on an inconvertible paper basis: discounts are computed on basis of nominal statutory par of 18d per peso.
Jan.
May
Sept.
1914
May
Sept.
1915
Jan.
May
Sept.
1916
Jan.
May


BILLS
ARAISO.
18
+20
Buenos Aires
Montevideo
Valparaiso
Rio de Janeiro
Sept.
Jan.
May
Sept
Jan.
May
Sept.
Jan.
1916
1917
1918

between 12*d.* and 14*d.* (12½ per cent to 25 per cent discount). The Chilean exchange movement was unlike any of the others. It was by far the most striking. As in Argentina and Uruguay, the general trend was upward; but the upward sweep was of incomparably greater extent than in the case of either of those countries. On the other hand, notwithstanding the spectacular ascent of the rate, Chilean exchange at no point rose to the statutory par, but remained throughout a depreciated paper exchange. The Chilean situation, complicated as it is by the depreciated paper basis of the currency, must be left for later treatment.

Leaving out of account for the present, then, the complicating factor of depreciated paper currency in Chile, the outstanding facts shown by the chart are two:

1. The abnormality of the fluctuations of exchange in all countries, and
2. The striking difference, as regards the direction of the exchange movement, between Brazil on the one hand, where the rate has fallen markedly, and Argentina, Uruguay, and Chile on the other, where exchange has risen no less markedly. The explanation of this difference is the main purpose of this article.

The abnormality of the exchange fluctuations in itself requires no further comment. As we have seen, it was the inevitable consequence of the violent interruptions and alterations of commercial and financial international currents occasioned by the war, coupled with the reluctance of the countries at war to part with gold, and the consequent embargoes placed upon its export.

We shall proceed to the consideration of the second point, the comparison of the exchange movements in the several countries; and we shall discuss the changes in foreign trade and finance responsible for those move-

ments. Enough has been said, in the consideration of the Argentine credit-exchange arrangement, to indicate the general lines of the analysis. Since the rate of exchange fluctuates with the conditions of supply of and demand for bills, and since the supply and demand comprise all international transactions, the first originating in those transactions for which payment is due to the given country, and the second in those for which payment is demanded from the country by the outside world, our analysis of exchange movements resolves itself into a study of the balance of international payments in each country, an offsetting of "credits" against "debits." On the credit side of the balance are the exports, borrowings of foreign capital, interest receivable on capital invested in other lands, and other items for which payment is due to the country. On the debit side are the imports, interest owed on foreign capital invested in the country, immigrants' remittances, maritime freight charges, and other such items. Not all of the items are available for each country, but because of the striking character of the changes that occurred, it is possible to arrive, substantially, at definite conclusions regarding their effects. In addition to the balance of international payments, some attention must be given, briefly, to the monetary complications — so prevalent in South American countries — which affect the nature and course of the exchanges. We begin with Argentina.

II. Exchange and the Balance of International Payments

1. *Argentina*

Buenos Aires exchange rests securely on a gold basis, the unit being the gold peso (= 47.58*d.*, or United States $.965) created by the Monetary Law of 1881.

For two decades after the passage of this statute, however, the real currency of the country was depreciated inconvertible paper, the premium on gold fluctuating violently. During the Baring Panic of 1890–91, which was precipitated by extravagant borrowing of foreign capital and a consequent land and railroad boom, coincident with lavish issues of paper under the National Bank system, the premium reached a height of 364 per cent,[1] a figure probably not paralleled in any important country in the nineteenth century.

By 1899, however, largely in consequence of a succession of favorable balances of international payments, and a consequent inflow of gold, the premium on gold had fallen to 127 per cent, so that the paper peso was worth $.44 of the gold peso of 1881. By the Conversion Law of 1899 the value of the paper peso was definitely stabilized at the existing rate, $.44 gold, by means of a conversion fund for the free exchange of paper into gold and gold into paper at that rate. Since 1899, therefore, the paper currency, the only currency in use in the country, has maintained a stable value, resting securely upon a gold basis. The Uruguayan is also a gold exchange, the peso having a par value of 51*d.*, or United States $1.034.

Turning now to the war period, our chart (p. 426) indicates that until August, 1914 Argentine exchange fluctuated within the specie points, the extreme fluctuations being 47$\frac{7}{16}$ (July) and 48$\frac{3}{8}$ (March), 1.9 per cent below par and 1.6 per cent above par respectively. In August and September, 1914, the exchange market was virtually inoperative, Buenos Aires being quoted as "nominal." Thereafter the fluctuations became wider, but did not depart far from the gold import point until

[1] In October, 1891. See Martinez and Lewandowski, La Republica Argentina en el Siglo xx, p. 479.

the fall and winter of 1916–17 (Argentine spring and summer), when the exchange rose to 52 (January, 1917), a premium of over 9 per cent. In the following winter exchange rose to 53½ (December, 1917), a premium of 13 per cent.

Up to this point, the Argentine and Uruguayan exchanges were markedly in sympathy with each other. This correspondence was to be expected, since the two countries form, in many respects, a homogeneous trade area, buying and selling the same commodities, and financing their international transactions through the same hands. After January, 1918, however, the correspondence was lacking. Montevideo exchange ascended to 64¼*d.* (27.9 per cent above par), while the Buenos Aires exchange, after an initial fall to 50½*d.*, remained fairly stable. This lack of correspondence of the two exchanges is ascribable mainly to the credit-exchange arrangements which have been described. It will be recalled that the Argentine conventions went into effect early in 1918, the Uruguayan agreements not being completed until summer.

Throughout the course of both of these exchanges there is noticeable an annual wave movement, reaching its crest in the winter months (South American summer) and its trough in the summer months. This wave movement is due chiefly to the alternation of active and inactive seasons in the export trade. From October to May, approximately, the harvest comes to port and is shipped; there is consequently a flood of bills of exchange offered for sale by the exporters, and the rate moves upward. From May to October, the exchange market is less active.

The most important feature of the exchange movement is the marked rise, appearing first in the winter of 1916–17, and becoming still more striking in the winter

of 1917–18. This rise is to be explained by reference to the changes occurring in the balance of international payments.

For the analysis of these changes we are fortunate in having the computations of Dr. Alejandro E. Bunge, Director General of National Statistics of Argentina, and those of Señor Carlos Alfredo Tornquist, one of the most eminent bankers and financiers of Argentina.[1] Dr. Bunge has computed the Argentine balance of payments for 1916, and Sr. Tornquist has computed the balance for each year since 1913.[2]

For the purpose of this study it will be sufficient to present the summary figures of Sr. Tornquist's balances for 1913–14 and 1916–17. Sr. Tornquist makes his computations for the Argentine "economic year," October 1 to September 30. In the following tables these balances are given in summary form. The first gives the balance for the year 1913–14, the second for the year 1916–17.[3]

[1] Sr. Tornquist possesses the best financial and commercial library in Buenos Aires. His father, the late Sr. Ernesto Tornquist, was the intimate adviser of Presidents Pellegrini and Roca during the period following the Baring Panic (1890–91), and, with finance minister Dr. J. M. Roca, the author of the Conversion Law of 1899.

[2] These balances were presented to the writer during a visit to Buenos Aires in 1917–18, as travelling fellow from Harvard University.

[3] The reader will note the absence of the item of freight charges from the Argentine balances. This omission is intended. Freight charges do not constitute an item in the international payments of Argentina, by reason of the method followed in recording the statistics of foreign trade. "Value of Imports" is compiled by the use of an official list of import prices ("tarifa de avaluos") which serve as standards for the computation of custom duties. When originally drawn up this list represented the actual prices of imported commodities and thus included freight charges on imports. From lack of regular and accurate revision of the list, however, the "tarifa de avaluos" has for years past conformed very imperfectly to actual import prices, and Dr. Bunge, Director General of Statistics, has initiated the practice of correcting the import statistics compiled from this list, by reference to the actual market prices. Concerning freight charges on exports Dr. Bunge says: "The prices taken (as the basis for compiling 'Value of Exports') are those of our (the Buenos Aires) market. Maritime freights, which do not come into the country because all the shipping which carries our products is foreign, are not paid by us; they do not occasion either a credit or a debit of our country toward the outside world, and ought not to figure as an item of our foreign commerce." El Intercambio Economico de la Republica Argentina en 1916, p. 13.

THE ARGENTINE BALANCE OF PAYMENTS, 1913–14
(Thousand gold pesos (peso = $.965))

CREDIT		
1. Exports	404,250	
2. Capital invested [1]	114,000	
Total		518,250
DEBIT		
1. Imports	392,100	
2. Debt Services	177,300	
Total		569,400
BALANCE	−51,150	
Reduction of Gold Stock in Country	+32,600	
NET BALANCE		−18,550

THE ARGENTINE BALANCE OF PAYMENTS, 1916–17
(Thousand gold pesos (peso = $.965))

CREDIT		
1. Exports	599,300	
2. Capital invested	30,300	
Total		629,600
DEBIT		
1. Imports	357,500	
2. Debt Services [2]	201,500	
3. Immigrant's Remittances	10,000	
4. Tourist's Expenditures	3,000	
5. Subscriptions to War Loans	8,500	
Total		580,500
BALANCE	+49,100	
Increase in Gold Stock of Country	−33,143	
NET BALANCE		+15,957

[1] The separate items under "Capital Invested" are:

1. Two loans contracted by the national government, and one by the federal capital	$46,200,000
2. Securities issued in Europe by railroad and other companies in Argentina	34,300,000
3. Bonds sold in Europe (cedulas, paving bonds, etc.)	23,500,000
4. Interest reloaned by mortgage companies	5,000,000
5. Private mortgages and other investments	5,000,000
Total	$114,000,000

[2] The separate items under "Debt Services" are:

1. Service of the public debt	$49,800,000
2. Service of foreign mortgage investments in Argentina	16,800,000
3. Service of cedulas	9,900,000
4. Service of railway capital	40,000,000
5. Service of other foreign capital	33,000,000
6. Repayment of short-time public loans	53,000,000
Total	$201,500,000

These tables indicate a reversal of the Argentine international situation between the last year prior to the war and the year ending September 30, 1917. If we leave out of account, for the moment, the item relating to changes in the gold stock of the country, we find in 1913–14 that the balance was unfavorable to Argentina by $51,150,000. It is well known that the year 1913–14 witnessed a "near-panic" in Argentina; the unfavorable balance of payments, the consequent downward pressure on exchange, and the large outflow of gold were important factors in that situation. Turning to 1916–17 we find a different situation. The balance of payments is favorable, the excess of the credit account over the debit account amounting to $49,000,000.

But both of these figures were reduced by international gold movements; and since the interruption of gold movements forms an important part in the explanation of the abnormal state of the Latin American exchanges, the figures of the balance sheets relating to this item deserve separate attention. By virtue of the normal exchange mechanism, already reviewed, an excess of debits over credits drives exchange to a discount and induces an outflow of gold; and, contrariwise, an excess of credits over debits drives exchange to a premium and induces an inflow of gold. Gold movements, therefore, constitute the *balancing item*, so to speak, of international payments, by means of which credits and debits, and consequently the rate of exchange, tend toward a state of equilibrium. In view of this fact one would expect from the terms of the balance of 1913–14 to find a considerable outflow of gold. Such an outflow did occur, the net reduction of the gold stock of the country in that year being $32,600,000. Subtracting this sum from the unfavorable balance of $51,600,000, we obtain a net uncovered balance of $18,550,000 " against " Argentina.

In the same way, in 1916–17, one would expect, normally, a considerable inflow of gold; and such an inflow did occur, the net addition to the country's stock of gold in that year being $33,143,000. Subtracting this amount from the favorable balance of $49,100,000, we have a net uncovered balance of $15,957,000 " in favor of " Argentina. But in 1916–17 such a net inflow of gold appears at first glance surprising, since, as has been said, the nations at war had placed an embargo on the export of gold. The details of the gold movement in 1916–17 are therefore essential to an adequate understanding of the Argentine situation. Sr. Tornquist has given the figures of the gold movement by quarters; the net import in each quarter being as follows:

(000's omitted)	
Last quarter of 1916	$6,772
First quarter of 1917	24,021
Second quarter of 1917	2,301
Third quarter of 1917	49

It is seen that virtually all of the gold entered the country in the first two periods. The falling-off in the second quarter of 1917 is striking; and in the third quarter the gold movement is negligible. The heavy imports up to April, 1917, came from New York. They came in consequence of a balance of payments becoming increasingly favorable to Argentina. They served, in part and for the time, to meet that balance, and thus prevented the rate of exchange from rising so high as it would otherwise have risen. When the United States entered the war, the flow of gold from New York dwindled (as it had already done from the other countries at war), and soon ceased. The effect is seen in the next Argentine export season, the fall and winter of 1917, when the rate of exchange went much higher than in the preceding year, and made necessary the credit-exchange arrangements.

Further examination of the tables that have been given for 1913–14 and 1916–17 indicates in what manner the reversal of the balance of payments occurred. In the war period the flow of capital to Argentina, which in 1913–14 amounted to $114,000,000, was virtually cut off. Interest charges and other financial payments meantime increased, mainly through the paying off in 1916–17 of $53,000,000 of short-time public loans. These changes increased the net outgoings on all items of the balance except the foreign merchandise trade by $129,400,000. This increase on the debit side of the balance, however, was much more than offset by the striking change in the balance of merchandise trade. Exports increased $195,050,000; and at the same time imports decreased $34,600,000; with the result that the merchandise balance in 1916–17 was favorable by $241,800,000, a sum so large as to offset the net debit of $129,400,000 incurred on all other items, and leave a surplus of $49,100,000. Even after allowing for the "balancing item" of a net import of gold of $33,143,000, we find a net uncovered balance in favor of Argentina of $15,957,000 on all international transactions.

This striking alteration of the balance of merchandise trade is characteristic of all the Latin American countries. In all of them imports have been restricted, mainly by reason of the scarcity of shipping, the need for redistributing tonnage with a view to war requirements, and the desire on the part of the nations at war to conserve both tonnage and goods. In Argentina, Uruguay, and Chile, the shrinkage in imports has been accompanied by an extraordinary expansion of exports, in response to the war-stimulated demand of Europe and the United States for food stuffs and materials of war. It is this change in the merchandise balance which is mainly responsible, given foreign embargoes on gold, for the striking variation of foreign exchange.

Since the Argentine balances of payments have been presented with greater fullness and precision than is possible for the other countries, the simple presentation of the balances will suffice as an explanation of the rise of Buenos Aires exchange. There is not space for a detailed consideration of the merchandise trade by itself. The most important change therein, the great increase in value of exports, was due to the nature of the exports, of which meat, wool, and cereals are the chief. It is interesting to note, however, that the growth in value of exports was not wholly, or even chiefly, due to an increase in quantity exported. In 1917, the year we have studied, there was in fact a striking decrease in quantity, in the case of some of the chief exports. The following figures show the exports of meat and cereals from Argentina and Uruguay combined, for the period 1914–17.

EXPORTS OF MEAT AND CEREALS FROM ARGENTINA AND URUGUAY, 1914–17 [1]
(1000 tons)

	1914	1915	1916	1917
1. Meat:				
Carcasses of frozen sheep and lambs	2,845	2,246	2,165	1,609
Quarters of frozen beef	1,963	4,457	5,718	5,335
Quarters of chilled beef	3,398	1,309	933	670
2. Cereals:				
Wheat	958	2,449	2,245	898
Maize	3,512	4,331	2,827	896
Linseed	862	995	639	140
Oats	360	501	785	271
Barley	21	76	53	11

It will be seen that in these two, the most important branches of Argentine trade, quantity exports after a

[1] Data from the Argentine official Anuarios del Comercio y de la Navegacion, and Business Conditions in the Argentine, No. 40, Ernesto Tornquist and Co., Ltd., pp. 14–15.

rise in 1915 barely held their own in 1916, and in 1917 descended very considerably below the figures of 1914. The decrease of meat exports is ascribable to the increasing scarcity of shipping. The shrinkage of cereal exports, which is especially marked in every item, was due partly to shipping scarcity, but mainly to the drought and frost which in many districts ruined the 1916–17 harvest. It will be recalled that President Irigoyen placed an embargo on wheat for a time, and only consented to release wheat to Great Britain on condition that each shipment be replaced by an equal quantity of Australian wheat.

The increase of the value of exports, then, was mainly due to an extraordinary rise in export prices. Wheat selling at about $10 per 100 kilos in July, 1914 sold for $19 in June, 1917; corn rose in the same period from $5.75 to $13.50; linseed from $14.60 to $25. Wool selling at $7–$12 (paper) per 10 kilos, according to grade, in July, 1914, sold at $8–$18 in March, 1917, and at $20–$32 in January, 1918.[1] Similar increases, of from fifty to several hundred per cent, occurred in the other exported products; with the result that, notwithstanding considerable diminution in the quantities exported, the total value of exports showed marked expansion from the pre-war figures.

The Argentine situation, therefore, is sufficiently clear. The abnormal rise of foreign exchange was due mainly to the large favorable increase of the balance of merchandise trade. Let us compare with this situation that of Chile and of Brazil. In the case of these countries, since data concerning the " invisible " items of the balance of payments are meager and of uncertain reliability, we must treat mainly of the merchandise trade.

[1] Boletines de la Bolsa.

2. *Chile*

The following figures show the Chilean balance of merchandise trade from 1910 to 1917: [1]

CHILEAN BALANCE OF MERCHANDISE TRADE, 1910–17 [2]
(Thousand gold pesos (peso = 18d., or U. S. $.365.))

Year	Exports	Imports	Balance
1910	$328,827	$297,486	$+31,341
1911	339,409	348,990	−9,581
1912	383,228	334,455	+48,773
1913	396,310	329,518	+66,792
1914	299,675	269,757	+29,918
1915	299,591	153,212	+146,918
1916	505,963	222,521	+283,442
1917	703,544	355,077	+348,467

One's attention is arrested by the extraordinary growth of the balance in favor of Chile since 1914. The surplus increased from about 30 million pesos in 1914 to about 147 millions in 1915 (a fivefold increase), 283 millions in 1916 (a tenfold increase), and 348 millions in 1917 (a favorable surplus almost twelve times as large as that of 1914). On the other hand it should be noticed that the balance of 1914 was below the average for prewar years. The explanation of these changes in the balance is to be found in the first two columns of figures, which indicate the different effect of the war on Chilean trade at the beginning of the war and in later years. In 1914 there was a shrinkage both of exports and of imports, that in exports being particularly marked. In 1915 exports held their own but showed no increase, whereas imports decreased some 33 per cent from the 1914 figures. In 1916, the outstanding fact was the

[1] Anuario Estadistico, 1918, pp. 287–289.

[2] Some of the data and some portions of the text of the sections of this article devoted to Chile and Brazil are from a series of papers on Latin American trade balances and foreign exchange prepared by the writer for the Bureau of Foreign and Domestic Commerce, and distributed in typewritten form as "Latin American Circulars," in July and August, 1918.

enormous increase of exports, which gained almost 70 per cent in a single year, and set a new high-water mark in Chilean trade. In 1917 there was another large increase in exports. Imports also showed some gain, tho to a much less degree than did exports.[1] Broadly speaking, the figures indicate that the large favorable trade balance was due to the remarkable expansion of exports and to the shrinkage of imports.

The expansion of exports is ascribable chiefly to the growth of the nitrate trade to meet the war demand for explosives. Prior to the war about three-fourths of the exports of nitrate was for fertilizers, and about one-fourth for explosives. Under war conditions these proportions were reversed, only some 20 per cent of the exports being used for fertilizers and the rest for explosives and general chemical uses. The effect of the war upon exports of nitrate, and the importance of this product in the total trade of Chile is shown in the following table:

[1] In a study of the relation between the movements of foreign exchange and the balance of international payments, there should, in strictness, be included in the balance only those items which give rise to exchange operations. In much of the discussion of international balances this principle is overlooked. Merchandise trade figures, for example, are usually included in the balance in their entirety, as a matter of course. Yet it is by no means certain that all exports and all imports give rise to exchange transactions, or play any direct part in that chain of phenomena (exchange movements — gold movements — price changes — trade changes) so familiar to the reader of Mill or Cairnes. Without going into any detail, we may point out an important instance in the case of Chilean imports. In 1917 the exports of Chile to the United States were $142,000,000; the imports were $57,000,000, or about one-sixth of the total Chilean imports. These are the United States Department of Commerce figures. More than half of the so-called "imports" of $57,000,000, however, was represented by shipments of construction material and supplies to the Braden Copper Co., the Chile Copper Co., the American Smelting and Refining Co., the Bethlehem Steel Co., and the Du Ponts. All of these companies are American. The supplies sent to them were paid for in New York, and did not, therefore, have any effect whatever on the exchange situation in Chile. For unlike true imports they did not "make" Chilean exchange. Analysis of the Chilean imports, then, shows that the surplus of exports over imports (and the consequent upward pressure upon the exchange rate) was even greater than that shown by the official trade statistics. See Hearings before the Committee on Banking and Currency, United States Senate, Sixty-fifth Congress, Second Session, on S. 3928, statement by Mr. Leopold Frederick (treasurer of the first three companies named above, and formerly manager of the foreign exchange department of the National Bank of Commerce in New York).

EXPORTS OF NITRATE FROM CHILE, 1910–17 [1]
(000's omitted)

Year	Quantity (tons)	Value in gold pesos of 18d.	Per cent of total exports
1910	2,336	232,426	71
1911	2,449	262,003	77
1912	2,493	286,704	75
1913	2,738	314,909	80
1914	1,847	212,380	70
1915	2,023	232,679	78
1916	2,967	338,529	67
1917	2,798	475,819	68

As regards the quantity exported, the notable facts are the marked shrinkage in 1914 and the even more remarkable expansion in 1916 and 1917. At the beginning of the war, in view of the anticipated decline in the demand for nitrate for fertilizing purposes, many of the oficinas of nitrate-producing companies in Chile were closed, and by the end of 1914 out of a total of 170 only 43 were producing. By March, 1915 the number had fallen to 36.

Since the nitrate industry, as has been shown, represents some three-fourths of the total export trade of the country, and since, moreover, the government derives over 50 per cent of its revenues from the export duty on nitrates, the temporary cutting-off of the foreign market for this product represented a veritable calamity for Chile. The government took immediate steps to induce the producers to keep up operations. The President was authorized to make advances to producers of nitrate of three pesos for each quintal mined, and four pesos for each quintal ready for shipment, provided the producers should agree to keep up production. Authority was given to emit treasury bills, both for the purpose of granting assistance to the nitrate industry,

[1] Extracto Estadistico de la Republica de Chile, 1917, p. 139, and Anuario Etadistico, 1918, p. 185.

as above indicated, and also in order to make rediscounts for banks. These rediscounts paid an interest of 3 per cent less than the current rate charged by the banks, and were secured by mortgage bonds. About 21,000,000 pesos of these treasury bills were issued up to December 31, 1914 to nitrate producers, and 9,000,000 pesos to banks.

As a result of these measures, combined with the growing demand of the Allies for nitrate for explosive purposes, the corner was turned after March, 1915, and the number of oficinas in operation began to grow rapidly. At the beginning of 1916 we find 116 at work, out of a total of 172. In January, 1917, 118 were producing, and by September the total had increased to 124. Production therefore showed a substantial recovery:

(Thousand quintals[1])

	1914	1915	1916	1917
Production.....	53,500	38,200	63,300	65,100
Exports.....	40,000	44,000	65,000	60,800

Attention is called to the changing ratio between production and export. In 1914, only four-fifths of the amount produced was exported. In 1915 and 1916 the exports exceeded the amount produced within those years. In other words, at the outset of the war nitrate was not moved off as fast as it was produced. This was also the situation in 1917, owing to a scarcity of shipping. The result is seen in the course of nitrate prices in Chile. Tho nitrate prices abroad rose markedly, the price in Chile, in consequence of the surplus stock awaiting shipment, failed to respond in anything like the same degree.

It will be noted that down through 1916 the war demand for nitrate, in view of the circumstances cited

[1] Pan American Union, Bulletin of April, 1918, p. 537.

AVERAGE YEARLY PRICE OF NITRATE PER SPANISH QUINTAL,[1] 1910–16[2]

Years	Shillings
1910	6s. 11¾d.
1911	7s. 0¾d.
1912	8s.
1913	7s. 10d.
1914	6s. 11½d.
1915	7s. 4½d.
1916	7s. 8d.
1917	9s. to 11s.

above, had virtually no effect on nitrate prices in Chile. In fact, the 1913 price was higher than that of any of the three following years. In the production year 1916–17 (July to June), however, nitrate rose to 9 shillings the quintal. In the last half of 1917, particularly from August on, speculation ran the price up from about 10 shillings to 16 shillings the quintal. It does not appear that there was any sound basis for this rise, and the purchase by the United States government of 200,000 tons of German nitrate which had been lying idle in Chile, served to bring down selling prices to some extent. From the fall of 1917 for the remainder of the war, virtually all of the selling was to the British and United States governments at an officially controlled price. In the summer of 1918 the British government contracted for the purchase of 15,000,000 quintals (about 1,500,000 tons) at the price of 13*s.* for ordinary nitrate and 13*s.* 6*d.* for refined nitrate. Our chart, p. 426, shows that exchange reached its highest point (about 17*d.*, a rise of about 120 per cent above the rate ruling in 1914) while this contract was being made, and indicates strikingly the sympathy between the nitrate market and the exchange market.

[1] Quintal = 101.41 lbs.

[2] Extracto Estadistico, 1917, p. 119; and South American Journal, January 5, 1918, and April 6, 1918.

The other important Chilean export is copper. This, too, experienced a remarkable growth under war conditions. The following table shows the exports of copper from 1910 to 1917:

EXPORTS OF COPPER FROM CHILE, 1910–17 [1]

Year	Quantity (tons)	Value (pesos of 18d.)
1910.....	37,804	26,630,704
1911.....	34,587	20,501,183
1912.....	40,897	33,550,041
1913.....	41,323	30,894,566
1914.....	45,227	31,891,726
1915.....	53,587	45,409,745
1916.....	71,904	86,639,941
1917.....	78,183	104,413

Nitrate and copper represent the great bulk of Chilean exports. Other exports, such as cereals, wool, hides and skins, iodine, etc., are too small to exercise any influence on the major changes of the balance of trade. The shrinkage of imports, then, occasioned by the need of conserving tonnage, and the extraordinary expansion of the exports of nitrate and copper sufficiently explain the large and growing favorable balance of trade.

Such was the merchandise trade situation. As regards the " invisible " items of the balance of payments the data are meager and of uncertain worth. For the most important of these items, however, the payments of interest on foreign capital, there are fairly reliable figures. The following is a summary of the interest payments made in 1916: [2]

[1] Extracto Estadistico, 1917, p. 140, and Anuario Estadistico, 1918, p. 184.

[2] Compiled from Extracto Estadistico, 1917, pp. 63–78; and F. M. Halsey, Investments in Latin America and the British West Indies, No. 169 of Special Agents Series, Bureau of Foreign and Domestic Commerce.

INTEREST ON FOREIGN CAPITAL IN CHILE, 1916
(Thousand gold pesos (peso = 18*d.*, or U. S. $.365))

1. Interest and amortization on government foreign debt (429,620,600 pesos, Dec. 31, 1916)	29,973
2. Interest and amortization on railroad guarantees	10,866
3. Interest computed at 6 per cent on mortgage bonds of the Banco Hipotecario de Chile held abroad (total issue 112,000,000 pesos; part held abroad 67,803,000 pesos)	4,068
4. Interest computed at 5 per cent on all other private investment (1,463,472,000 pesos)	73,174
Total interest charge	118,081

Below is drawn up a rough balance of payments for 1916, showing the exports set off against the imports plus the interest payments:

	Thousand gold pesos of 18*d.*
Exports	505,963
Imports plus interest payments	340,615
Balance	+165,348

It is seen that exports alone exceeded imports and interest payments combined by over 165 million pesos. If there was any investment of private capital from abroad in 1916 (and some there was certainly, as is proved, for instance, by the sale of nitrate lands at auction by the government) the surplus in favor of Chile would be increased thereby.

There can be no doubt of the fact, then, that considering the total incomings and outgoings of Chile during the war, the balance was favorable to Chile by a wide margin. The effect of this large favorable surplus upon the rate of exchange was extraordinary. Comparing the rate at the outbreak of war, 7–8*d.*, with the rate ruling in the summer of 1918, 16–17*d.*, we find a rise of about 120 per cent, by far the most extraordinary alteration of exchange in any Latin American country.

This spectacular movement of the Chilean exchange was not due merely to the alteration of the balance of

payments. The changes in the Argentine balance were in the same direction, and scarcely less marked. Yet the movement of Buenos Aires exchange, as shown by our chart, appears insignificant as compared with that of Valparaiso exchange. The maximum rise of Buenos Aires exchange was but 13 per cent. As has been intimated in an earlier place, the reason for this marked difference in the movements of these two exchanges is to be found in the different character of their monetary bases. The Buenos Aires exchange is a gold exchange; that of Chile is a paper exchange. The currency of Chile is depreciated inconvertible paper. There is no specie in circulation, and no specie basis for foreign exchange transactions.

In a comparative summary of South American exchange conditions it is impossible to consider adequately the peculiarities of the paper exchange mechanism, or the forces which govern its operation. In Chile foreign exchange is bought with and sold for paper pesos. The value of the peso, and hence the rate of exchange of bills, depends on a number of highly unstable factors — on the quantity of paper in circulation relative to the domestic demand for money, on rumors as to the probability of the conversion of paper money into specie at some fixed date, on the degree of confidence reposed in the government, and hence on political changes, political gossip or scandal, a controversy in Congress, a political attack in the press. In a country like Chile, whose economic life (and public revenues) depend so largely upon foreign trade and foreign capital, the best single measure of the value of the paper peso is the rate of foreign exchange, which indicates what the peso is worth in terms of foreign gold moneys.[1] Anything which

[1] In other words, the rate of foreign exchange of a depreciated paper currency is substantially identical in meaning with a statement of the value of the depreciated currency in terms of a premium on gold.

affects, or is likely to affect, the conditions of supply of and demand for bills of exchange, will exercise a powerful influence on the (gold) value of the currency, or in other words, on the rate of foreign exchange. If a strike is threatened in the nitrate fields, down goes exchange, for there is danger that the supply of exchange will be reduced by reason of a reduction of exports of nitrate. If there is a rumor that the Chilean government intends to buy submarines in the United States, down goes the exchange again, for the purchase will increase the demand for bills of exchange, and thus drive down the rate.[1]

This condition of unstable currency goes back into the nineteenth century. The present system began with the law of July 31, 1898, which authorized the emission of 50,000,000 paper pesos. At the same time all bank notes previously issued were taken over by the government. Since 1898 the quantity of paper in circulation has been increased to 159,840,119 pesos (December 31, 1916), of which 150,000,000 have been emitted under the act of 1898.[2] The law of 1898 provided for a conversion fund, by means of which the conversion of the paper money into gold at the rate of 18*d.* per paper peso was to begin January 1, 1902. Conversion was postponed, however, until 1905; and before that date was reached a further postponement to 1910 was announced, and then to 1915. Meantime, the gold value of the paper peso, as indicated by the rate of foreign exchange, after maintaining a relatively high level through 1904 (about 16.5*d.*), declined gradually, and for the period 1908–13 ranged between 9.6*d.* (the average for 1908) to 10.8*d.* (the average for 1910). On the outbreak of war, exchange fell still lower, reaching $7\frac{1}{16}$*d.* in January, 1915,

[1] Sterling exchange in Valparaiso, it will be remembered, as well as everywhere else in South America, is expressed in terms of British pence.

[2] Extracto Estadistico, p. 65.

a depreciation of 61 per cent from the statutory par. Conversion was again postponed to January 1, 1917, and then to January 1, 1919. In the summer of 1918, with exchange at 16–17*d.*, there appeared to be a strong prospect that specie payments would this time be attempted, at the par rate of 18*d.* named in the law of 1898. This prospect was strengthened by the considerable inflow of gold in 1917. Notwithstanding the reluctance of the nations at war to part with gold, Chile secured their consent to considerable shipments of specie, especially from the United States, as a condition of the sale of nitrate.[1] The following figures show the specie movement for the years 1914–17.

CHILEAN IMPORTS AND EXPORTS OF SPECIE, 1914–17[2]
(Gold pesos of 18*d.*)

Year	Export	Import
1914.....	15,671	3,686,884
1915.....	40,357	1,035,724
1916.....	34,958	30,543
1917.....	522,507	16,446,805

In addition to these gold imports the Chilean government had collected (prior to the war) a gold fund with which to undertake the conversion of the 160 millions of paper pesos in circulation. At the end of 1916 this fund amounted to 87,759,702 pesos (gold), and was deposited in banks of foreign countries, as follows:

[1] Most of the gold imports of 1917 were in connection with the purchase by the United States government in the fall of 1917 of 200,000 tons of nitrate which had belonged to German firms (see above, p. 442). This sale had a double purpose. The United States wanted nitrate; Chile wanted to secure the portion of the Conversion Fund (see text) which was in Germany — about $10,000,000 — and have it transferred to Chile. A three-cornered arrangement was therefore made. The United States bought the 200,000 tons of German nitrate; the United States instructed the Federal Reserve Board to allow the shipment of the equivalent in gold to Chile; the German government arranged the payment in Germany to the former owners of the nitrate (probably in government bonds).

[2] Extracto Estadistico, 1917, p. 64; and Pan American Union, Bulletin of April, 1918, p. 537.

	(Gold pesos of 18d.)
In England	48,765,770
In Germany	22,225,687
In United States	3,124,605
	87,759,702

By March, 1918, the conversion fund had grown to 94,000,000 pesos (gold).[1]

But since the signing of the armistice, there has been a complete reversal of the Chilean exchange situation. The chart at p. 426, shows the fall of Valparaiso exchange in the closing months of 1918. From 16¼*d.*, the rate for September, we have a fall to 9¼*d.* by December 24. In other words, in a space of three months, the rate of exchange returned approximately to the pre-war level. Nothing could indicate more strikingly the fact that the rise of Chilean exchange was purely a phenomenon of war, the consequence of the abnormal demand for nitrate. With the armistice the large purchases of nitrate ceased. The correspondent of the *South American Journal*, writing in January, 1919, stated that "there have been practically no sales at all since October," tho the stocks in Chile were very large; and he estimated that the quantity still in the hands of the British government for sale amounted to 600,000 tons. The price had fallen to about 9*s.* per quintal, and the oficinas had cut down to about half their normal production.[2]

3. *Brazil*

The experiences of Brazil during the war present a rather striking paradox. Apparently she was the hardest hit and at the same time perhaps the most benefited, in a material sense, of all the Latin American

[1] The Economist (London), January 18, 1919, p. 70.

[2] South American Journal, January 11, 1919, p. 77.

countries. The effect of the war upon Brazilian finance, upon the currency, the course of foreign exchange, the foreign trade, has been distinctly less favorable than in the case of the other leading countries.

On the other hand, the serious dislocation of trade occasioned in virtually all Latin American countries by the war has in the case of Brazil brought about industrial and commercial changes which appear to mark the beginning of a new period in its economic life. Much attention has been devoted to cattle raising in southern Brazil.[1] Great packing plants, financed chiefly with American capital, have been built. There has also been a marked increase in the production of cotton and of cane sugar, for which the soil of Brazil, in the long coastal belt stretching from São Paulo to the Amazon, is preëminently fitted. By an arrangement with the Japanese government several thousand Japanese colonists have been brought to Brazil to teach the Brazilians how to grow rice that is cheap and of good quality. Equally significant is the development of Brazilian minerals, of which the state of Minas Geraes, just north of Rio de Janeiro, has a rich and varied supply. The iron deposits, among the largest in the world, had lain dormant before the war; but under the stimulus of war and the difficulty of importing metal products, smelting operations and the manufacture of high grade steel products have been undertaken. The mineral which the war has done most to develop in Brazil is manganese. The chief sources of supply prior to the war were Burma and Russia. The Russian supply was cut off during the war; that of Burma has about doubled since 1913. Brazil, meantime, has come forward as the principal source of manganese.

[1] According to the latest official figures Brazil has 30,000,000 head of cattle, about the same number as Argentina, but of poorer quality.

It is impossible in a paper like the present to describe the other changes that have occurred in Brazil, the rapidly growing exportation of lumber, the new developments in dye stuffs and pharmaceutical products, the really remarkable expansion in the manufacture of textiles [1] and shoes.[2] These latter industries were fairly well established, thanks to very high tariff protection, before the war. Whether they, and the other industries mentioned, will continue to develop without the stimulus of high prices, and under normal conditions of trade, remains to be seen.[3] Our purpose in the present paper is to consider the darker side of the Brazilian war-time condition, and to summarize the chief factors bearing upon the foreign exchange movement.

The striking fact is the marked fall of exchange, as contrasted with the rise in all the other countries studied. Up to July, 1914, exchange fluctuated closely

[1] In 1917 Brazil exported cotton textiles to France. More than half of the home needs in cotton textiles are supplied by Brazilian manufacture.

[2] The output of footwear is now about 20,000,000 pairs a year, over half being produced in the state of São Paulo.

[3] SOME NEW BRAZILIAN EXPORTS

Date	Quantity (tons)	Value (£1,000)	Date	Quantity (tons)	Value (£1,000).
	Refrigerated Meat			*Sugar*	
1913	0	0	1913	5,367	65
1914	0	0	1914	31,860	373
1915	8,514	310	1915	59,074	756
1916	33,661	1,414	1916	53,824	1,286
1917	66,452	3,134	1917	131,509	3,624
	Kidney Beans			*Rice*	
1913	4	0	1913	49	2
1914	4	0	1914	3	0
1915	276	5	1915	3	0
1916	45,594	686	1916	1,124	24
1917	93,428	2,150	1917	42,590	1,262
	Manganese				
1913	122,300	181			
1914	183,630	278			
1915	288,671	536			
1916	503,130	1,478			
1917	532,855	3,062			

about par, 16*d.* per milreis. Our chart shows what occurred thereafter. With the outbreak of war the rate broke so sharply as to compel the closing of the exchange. A bank holiday of fifteen days was declared. In October exchange was quoted at the very low figure of 11½*d.* In other words, the value of the Brazilian milreis had depreciated about 31 per cent from the rate ruling in July. In November there was a partial recovery, to 14*d.* Then followed another, more gradual, drop to 11–12*d.* in 1916. Since 1916 the rate, tho somewhat higher than in the earlier years, has shown no sign of a return to the pre-war level, but has fluctuated between 12*d.* and 14*d.* (25 per cent and 12½ per cent below par).

As with the other countries, explanation of the exchange movement is sought in the balance of international payments. We begin with the merchandise trade. The following table shows the exports and imports of Brazil for the period 1910–17, and strikes the balance:

EXPORTS AND IMPORTS OF BRAZIL 1910–17 [1]

(U. S. $1,000)

Year	Exports	Imports	Balance
1910	303,000	230,000	$+73,000
1911	321,000	253,000	+68,000
1912	362,246	307,865	+54,381
1913	313,628	326,026	−12,397
1914	221,539	165,747	+55,792
1915	255,659	145,749	+109,910
1916	265,802	194,582	+71,310
1917	290,993	216,319	+74,674

The important fact to be gathered from the preceding table is that *both* imports and exports were at a lower level in the war years than in the pre-war period. The diminution of imports requires no comment. It is a characteristic of the trade of all Latin American coun-

[1] From the Brazilian annual commerce reports, Estatistica Comercial.

tries during the war, the result of the conservation of tonnage and goods for war uses. The falling off in exports, however, is significant. Here again the Brazilian experience is strikingly different from that of the other leading South American republics. The war caused a marked increase of demand for Argentine wheat, meat, and wool, and for Chilean nitrate and copper; and since these products represent the bulk of the exports of those countries, their total exports expanded remarkably. Meantime, Brazilian exports were below the pre-war level. The following table compares the exports of Brazil, Argentina, and Chile for the period 1911–17:

EXPORTS OF BRAZIL, ARGENTINA, AND CHILE, 1911–17
(Absolute figures, in U. S. dollars; 000's omitted)

Year	Argentina	Chile	Brazil
1911	$330,336	$123,884	$321,000
1912	484,109	139,878	362,246
1913	500,986	144,653	313,628
1914	389,022	109,381	221,539
1915	561,803	109,350	255,659
1916	552,945	184,676	265,802
1917	530,914	256,768	290,993

In the following table the exports of these three leading Latin American countries are reduced to relative numbers. In the case of each country the average of the pre-war years 1911–13 is taken as the base (100 per cent) and the index number for each year is computed:

EXPORTS OF BRAZIL, ARGENTINA, AND CHILE, 1911–17
(Index numbers)

Year	Argentina	Chile	Brazil
1911	75	91	97
1912	111	103	109
1913	114	107	95
1914	89	73	67
1915	128	73	77
1916	126	136	80
1917	121	189	88

The index numbers enable one to see more readily than do the absolute figures given in the preceding table just what occurred in the export trade of the three countries. Argentine exports were particularly large in 1915. Chilean exports in 1915 were below the pre-war level. In 1916, however, the growing demand for nitrate and copper manifested its effects, producing an astonishing increase (to far beyond the pre-war level) in Chilean exports of that year; in 1917 the expansion continued. Brazilian exports, meanwhile, were distinctly below the level of the pre-war period.

The reasons for this difference between the experience of Brazil and that of other countries are several. In the first place, it should be said that the decline in Brazilian exports was not a decline in the *quantity* exported. In fact, tonnage of exports in 1916 and 1917 considerably exceeded that of 1912 and 1913. What has happened in Brazil is that the *mean value* of Brazilian export tonnage has constantly decreased. In other words, while prices of exports in other South American countries were rising, export prices in Brazil were actually declining during the war. The mean value per ton of Brazilian exports was $237 in 1913, $179 in 1914, $148.5 in 1915, and $148 in 1916. These figures demonstrate the relatively high value of Brazilian produce to its weight in pre-war years, under normal circumstances, and the striking decline in value per ton during the war.

This question of export prices has, perhaps, a direct connection with the course of foreign exchange. An exporter of wheat in Buenos Aires, for example, in quoting a price to the foreign buyer, would base his quotation upon three factors, the price of wheat in the Buenos Aires market, the maritime freight rate, and the current rate of exchange. With the abnormally high

rate of exchange ruling during the war, the exporter having for sale a foreign bill of exchange received in payment of produce sold, was obliged to sell it at a ruinous loss, owing to the existing depreciation of foreign moneys in terms of the Argentine or Uruguayan peso. To protect himself against loss, the exporter had to raise the price of his goods to a figure sufficient to offset the difference on exchange. In Brazil, as we have seen, exchange was not above normal, but decidedly below it. The bearing of this fact on prices is apparent. Foreign moneys being at a premium, the exporter who had sold abroad Brazilian goods and received a foreign bill of exchange in payment therefor, could cash his bill at a premium. In consequence, he could afford to sell at a lower, rather than a higher, price than in former years.

This statement of the connection between exchange and price, however, is put forth merely as a suggestion of one factor, and probably a minor one, in the explanation of the different course of export prices in Argentina and Chile on the one hand, and Brazil on the other. It is a commonplace that in peace times South American exports, except for coffee and nitrate, constitute too small a proportion of the world stock to control the world price. Rather, South American export prices are dominated by the prices ruling in the principal markets to which the exports are sold. Much more was this the case during the war. Export prices, total value of exports, foreign exchange, rose in Argentina and Chile as the direct consequence of war demand for Chilean nitrate and Argentine meat, wheat, wool, and hides. It is at this point that one finds the explanation of the difference between the Brazilian experience and that of the other countries. The exports of Brazil did not expand for the reason that they were not the sort of prod-

ucts for which there was a war demand. At least, this is true of the pre-war Brazilian staple exports.

The bulk of the exports of Brazil has for years consisted of two products, coffee and rubber. For example, out of total exports of $313,628,000[1] in 1913, rubber and coffee comprised $248,579,000, or about four-fifths of the total. By far the most important single export is coffee, which in 1913 amounted to $198,157,000, or over 63 per cent of the total exports. Coffee is not a war commodity. The Allied powers therefore restricted its import. Even more serious is the fact that the large demand from Central Europe, amounting normally to about 4,000,000 bags a year, was cut off. In consequence, the United States was the only unrestricted market for Brazilian coffee, taking about one-half the total exports. Added to these pronounced restrictions of the demand for coffee is the fact that the Brazilian supply during the war was somewhat above the pre-war normal. The result was that Brazil had on its hands an increasing stock of coffee which it could not hope to dispose of until after the war.

This situation became acute almost immediately upon the outbreak of war, and led in 1915 to the reëstablishment of a valorization system, along somewhat different lines from the famous plan of 1907–08. The federal government by a law of 1915 authorized the issue of 350,000,000 paper milreis, of which a part was to be used for carrying out a new plan of coffee valorization. The paper money was lent by the federal government to the state of São Paulo, which has been conducting the valorization operations. The original plan was to prohibit the export of coffee above 6,000,000 bags a year; the 4,000,000 bags which in normal times went to Germany, Austria, etc., to be held in Brazil, the state of

[1] Figures are given in United States dollars.

São Paulo lending, in paper money, up to 60 per cent of a value to be fixed on a basis of past averages to coffee growers who deposited their coffee in warehouses; the warehouse receipts to be handed over by the state government to the federal government as collateral for the issue by the latter of the paper money. This loan feature was dropped, however, and instead the state of São Paulo undertook to purchase at an official price so much of the annual coffee crop as might appear sufficient to maintain prices, or, failing in that, so much as it might be able to purchase with the paper money funds supplied to it by the federal government under the laws above mentioned.

In 1918 the São Paulo government bought large quantities of coffee at the price of 4$900 [1] per 10 kilos (i.e., about $1.24 for 22.4 lbs.). The ordinary market price, however, was lower, between 4$600 and 4$500. Interior shippers and planters demanded that their coffee be sold to the government, and the coffee Associacão of Santos presented a memorial to the government requesting a further issue of 300,000,000 milreis of paper money for additional valorization purchases.

The statement on page 457 indicates the coffee position up to May, 1918. The table indicates that of a total crop of 17,000,000 bags, about 13½ million actually came to market; of this quantity somewhat more than 7 million bags were exported, leaving the enormous quantity of 5,939,291 bags of the 1917–18 crop, and 1,100,000 bags of the 1916–17 crop — a total of virtually 7,000,000 bags, or as much as the total 1917–18 exports — in storage in Brazil and unable to find an outlet. The state of São Paulo, it is seen, was itself holding almost 2,800,000 bags, or almost 40 per cent of the total amount in storage.

[1] I. e., 4 milreis, 900 reis.

THE COFFEE POSITION, 1917–18 CROP[1]

	Bags
In hands of São Paulo government, April 30, 1918	2,788,875
In hands of commissarios and exporters, inclusive of 600,000 bags bought by São Paulo government	4,150,416
Shipped coastwise	281,000
Exported up to April 25, 1918	7,325,665
Total	14,545,956
Less stock on June 30, 1917	1,100,000
Net total	13,445,956
To come down to complete estimated crop	3,554,044
Total crop	17,000,000

The fact is that the supply of Brazilian coffee was hopelessly in excess of the demand. The result was that in spite of the large purchases by the government, the price of coffee in Brazil went steadily downward. Meantime, as a result of rising freight and insurance rates (which are, moreover, additional causes of the diminution of exports) foreign coffee prices rose. The following table shows the price of Brazilian coffee in London and in Santos for the period 1911–18:

PRICE OF COFFEE, 1911–18[1]

Date	London Shillings cwt.	Santos Paper Milreis 10 kilos = 22.4 lbs.
Oct. 16, 1911	66*s.* 9*d.*	8$600
March 26, 1911	62*s.* 3*d.*	7$900
" 1913	52*s.* 9*d.*	6$250
" 1914	41*s.* 3*d.*	4$750
" 1915	43*s.*	5$150
" 1916	44*s.* 6*d.*	4$900
" 1917	53*s.* 6*d.*	5$500
" 21, 1918	66*s.* 9*d.*	4$100

[1] Data on the "coffee position" and on prices from Wileman's Brazilian Review for May and June, 1918.

By midsummer of 1918 the purchases of coffee by the state of São Paulo amounted to 4,500,000 bags. The congestion was further relieved by an arrangement made with the French government by which 2,000,000 were purchased on behalf of France. The 1918–19 crop, at first estimated at 10,500,000 to 12,000,000 bags, was considerably reduced by a severe frost in São Paulo on July 9, 1918. See Fielding Provost, "The Brazilian Coffee Situation," Pan American Magazine, September, 1918, pp. 225 *et seq.* On September 6, 1918 there were 6,351,000 bags of coffee on hand in Santos and 884,000 in Rio de Janeiro, as compared with 2,825,000 bags in both places combined on the same date in 1917. Bulletin of the Pan American Union, October, 1918, p. 604.

The different course of Brazilian and foreign prices is apparent. After the initial fall to 41*s.* 3*d.* in 1914 provoked by the liquidation of speculative accounts that followed the Balkan war, London quotations moved upward with the increasing charges for freight and insurance. The course of prices in Brazil was just the contrary. Since October, 1911, when owing to reckless speculation prices reached the maximum in both the Brazilian and the London market, prices in Brazil, with the exception of a slight reaction in 1915, due to extraordinary activity in the trade with Scandinavia and the United States, dropped continuously, until at 4$100 per 10 kilos it is doubtful if they sufficed even to cover the cost of production.

The facts that have been presented — the restriction of markets, the decline of prices, the abnormal accumulation of stocks in Brazil — find their most convenient expression in the figures of coffee exports. The following table shows the exports of coffee for the years 1913–17. Both quantity and value figures are given:

EXPORTS OF COFFEE FROM BRAZIL, 1913–17

Year	Quantity (1,000 bags [1])	Value (U. S. $1,000)
1913	13,267	$198,157
1914	11,270	131,220
1915	17,061	156,443
1916	13,039	138,296
1917	10,605	112,033

Except for the reaction in 1915, it is seen that the trend of coffee exports, both in quantity and in value, was pretty steadily downward. The increased quantity exports of 1915, almost 4,000,000 bags greater than in 1913, is noteworthy. But because of reduced prices, the value figures of the 1915 exports were more than $40,-

[1] Bag = 132 lbs.

000,000 less than in 1913. After 1915 the decline in both categories is striking. The year 1917 was the low water mark. Quantity exported fell almost 6,500,000 bags below 1915, and the value fell over $44,000,000 below the 1915 figures, and over $86,000,000 below the 1913 figures, a decrease of 45 per cent. It ought to be said, too, that 1913 was by no means a normal year, exports of coffee being $28,114,880 below the 1912 figure.

A close second to the falling-off in coffee was the decline in exports of rubber, the other major export. The following table gives the quantity and value of rubber exported in the years 1913–17.

EXPORTS OF RUBBER FROM BRAZIL, 1913–17

Year	Quantity (Million tons)	Value (U. S. $1,000)
1913	36,232	43,223
1914	33,531	34,326
1915	35,165	34,214
1916	31,495	36,431
1917	33,980	36,435

Rubber exports show a decrease of 2,252,000 tons and $6,788,000, or about 16 per cent. The table indicates, however, that the decline took place in 1914; in later years the trade slightly improved.

The discussion of coffee and rubber indicates sufficiently the reasons for the failure of the Brazilian export trade to expand during the war; and in consequence, explains why, while the trade balances of Argentina and Chile have been rising phenomenally, the Brazilian balance has undergone but little change. The table on the next page compares the trade balances of Brazil, Argentina, and Chile for the years 1910–17.

The difference between the Brazilian situation and that of Argentina and Chile is apparent at a glance. Except for the year 1913, a year of unusually large im-

COMPARISON OF THE TRADE BALANCES OF BRAZIL, ARGENTINA AND CHILE, 1910–17
(U. S. $1,000)

Year	Brazil	Argentina	Chile
1910	$+73,000	$+20,125	$+11,439
1911	+68,000	−40,539	−3,497
1912	+54,381	+92,194	+17,881
1913	−12,397	+59,977	+24,379
1914	+55,792	+74,726	+10,920
1915	+109,910	+278,789	+53,625
1916	+71,310	+199,630	+103,456
1917	+74,674	+169,849	+127,178

ports, the Brazilian balance was favorable. Except for the year 1915, however, the balance in favor of Brazil in the war years was about of the same size as in pre-war years. Meantime the balances in favor of Argentina and Chile show a large increase. Relating these facts to the course of foreign exchange, it is not surprising that in Argentina and Chile, by reason of the great excess of supply of exchange, representing the exports, over the demand for exchange, to pay for imports, exchange experienced a phenomenal rise; whereas in Brazil, where there was no such change in the trade balance, there was no such rise of exchange.

What in fact occurred, as we have seen, was a pronounced fall of exchange; and the balance of merchandise trade, by itself, does not provide an explanation of the fall. As in the case of Chile, there are but few data on the other items of the balance of payments; but for what are by far the most important items, foreign borrowings and interest payments, a fairly trustworthy computation can be made.

Financially, Brazil fared worse than any of the other South American republics during the war. The outbreak of war produced an acute situation, the reasons for which go back a considerable space into the pre-war period. Brazil had for long been accustomed to a large

inflow of foreign capital. The six year period 1908–13, in particular, witnessed a program of heavy borrowing, both by the federal and the state governments, and by private enterprise. The following figures show the amount of new foreign capital annually invested in Brazil during the period 1908–16:

AMOUNT OF NEW CAPITAL IN BRAZIL, 1908–16 [1]
(U. S. $1,000)

1908.....	140,000	1913.....	202,727
1909.....	101,386	1914.....	.....
1910.....	163,936	1915.....	.....
1911.....	188,305	1916.....	5,500 [2]
1912.....	123,773		

The easy acquisition of foreign capital led the governments and private individuals into extravagances — into unusually large military and naval expenditure, into railway and other public projects which could yield a return only after some years of waiting. According to official statements, the revenues of Brazil for the five years 1910–14 totaled 2,762,008 contos (paper), while expenditures amounted to 3,514,155 contos, leaving the enormous deficit of 752,147 contos, or $238,123,000. During the first four years, 1910–13, the deficit was $159,123,000, or an average of $39,781,000 per year. In 1914 it was nearly double that sum. Owing to the war, the revenue decreased to 375,098 contos, while expenditures, tho considerably lower than in the preceding year, amounted to 636,781 contos, thus leaving a deficit of 261,683 contos, or $78,902,000.

The outbreak of war did more than cut down government revenue. It shut off the inflow of foreign capital which was at the bottom of the extravagant expenditure. The sudden cessation of investment in 1914, moreover,

[1] Translation in the Pan American Magazine, November, 1918, pp. 16 et seq., of an official statement by Elysio de Carvalho.

[2] $5,500,000 lent to the municipality of São Paulo by United States banks.

came after some rather trying experiences in 1913. Brazil was seriously affected by the stringency in foreign money markets which followed the outbreak of the Balkan War. The year 1913, moreover, witnessed a slump in coffee and rubber prices. The value of coffee and rubber exported in 1913 was nearly $56,000,000 less, altho the exports of coffee were over a million bags larger, than in 1912. Total exports declined from over $362,000,000 in 1912 to less than $314,000,000 in 1913. At the same time imports increased from about $308,000,000 to $326,000,000. The result was that in that year the balance of trade was unfavorable by about $12,000,000.

In consequence gold began to flow out of Brazil, and the exchange rate was threatened. In 1912 there was a net inflow of gold amounting to $17,500,000. In 1913, on the other hand, there was a net export of gold of over $23,000,000. Brazilian exchange would have fallen in 1913 from the high level of the 1910–12 period had it not been for the important service performed by the Conversion Office, which issued gold freely to maintain exchange, its gold holdings falling in consequence from 386.7 to 276 million milreis during 1913.[1]

When the war broke, the federal government was negotiating for a loan in London. The failure of the negotiations made it impossible for the government to pay interest on its foreign obligations. In October, 1914, an agreement was made with the foreign bondholders, represented by the Rothschilds, for a funding loan of £15,000,000.[1] The interest on the foreign debt was paid in the bonds of this loan up to August, 1917, when interest payments were resumed. Amortization of the foreign debt was suspended for thirteen years (until 1927). The effect of the funding loan was to take

[1] South American Journal, January 18, 1919, p. 37.

the weight of the foreign interest payments off the exchange market, temporarily, thus preventing a fall of exchange much more serious than that which actually did occur.

As it was, exports of gold increased to the high figure of $40,144,000 in 1914; and the stock of gold in the Conversion Office was reduced to 138.5 million milreis by the end of the year. In December, 1914, the President was authorized to suspend the redemption of notes until December, 1915, the suspension being subsequently extended. The government resorted to issues of paper money. The first issue, authorized by law of August 24, 1914, was for 250,000,000 milreis. A second issue, of 350,000,000 milreis, was authorized by law of August 28, 1915. By June 30, 1918, the total quantity of inconvertible paper in circulation was 1,534,252,000 milreis, representing an increase of 945,000,000 milreis since August 26, 1914.[1]

In other words, throughout the war Brazil has been on an inconvertible paper money basis; and the foreign exchanges have been subject to all of the fluctuation and unsteadiness which is inherent in every inconvertible paper situation, and of which the most interesting instance today is Chile. Large emissions of paper, moreover, have precisely the same effect on the rate of exchange as does an unfavorable trade balance. They affect unfavorably the ratio between the domestic paper and foreign gold moneys, by increasing the supply of the former relatively to the demand for it, and thus cause its depreciation in terms of foreign gold. Here, then, is undoubtedly one of the causes of the present low rate of Brazilian exchange.

[1] South American Journal, January 18, 1919, p. 37. At the end of 1918, the quantity of paper in circulation was stated to be about 2,000,000,000 milreis. Revista de Economia y Finanzas, pp. 609, 610.

Another cause is contained in the borrowing program which we have reviewed. The heavy borrowings have given rise to an increasingly heavy interest charge. According to Sr. Elysio de Carvalho, whose figures of new annual borrowings were given above, p. 461, the total foreign capital invested in Brazil was in 1917, $2,000,000,000.[1] Of this sum $577,240,000 is the foreign debt of the federal government (December 31, 1917), and $301,116,376, the foreign indebtedness of the individual states and municipalities (December 31, 1916); the remainder, or $1,122,000,000, representing private investment. The annual interest charge on the federal foreign debt is about $30,000,000, but owing to the funding agreement, which did not end until August, 1917, only $11,993,506 was paid in 1917. Interest on all other foreign capital ($1,423,000,000) at 5 per cent equals $71,150,000; the total interest charge in 1917 was thus about $83,144,000. When this sum is added to the imports ($216,319,000), we have a total of outgoings from Brazil of about $299,463,000, as against $290,993,000 of exports. The favorable trade balance of $74,674,000 (shown on p. 460) is thus converted into a deficit of $8,470,000. Had the full interest charge on the federal foreign debt been paid, the balance would have been much more unfavorable.

To sum up the discussion of Brazilian exchange, the suspension of specie payments by the act of December, 1914, the large emissions of inconvertible paper money since that date, the sudden shutting-off of the large annual inflow of foreign capital by the outbreak of war, which brought upon Brazil the full burden of the interest charge — these factors, combined with the serious shrinkage of the exports of coffee and rubber and the

[1] Of the total amount $1,750,000,000 is European. Of this $705,000,000 is English, and $600,000,000 French. Pan American Magazine, November, 1918, pp. 20 et seq.

consequent failure of the export trade to expand, as it has done in other countries, brought it about that whereas in the other countries exchange rose remarkably, in Brazil the level of exchange during the war was considerably below the level of pre-war years.

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POSITIVE CONTRIBUTIONS OF SCIENTIFIC MANAGEMENT

THE ELIMINATION OF SOME LOSSES CHARACTERISTIC OF PRESENT-DAY MANUFACTURE

SUMMARY

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I. Introduction

Today, when present and impending conditions are trying men's souls and forcing a weighing in the balance of their past achievements in so many directions, it seems appropriate and important to make at least a partial appraisement of the contributions of scientific management to the field of industrial problems. It may be well, however, at the start to look back briefly over the successive stages of its development in order to arrive more fairly at a true estimate of its present value, and to enable a correct forecast of its potential worth as a means for the adjustment of present and future social and economic problems.

As long as the early discussions and the evolution of the science were confined within the bounds of the American Society of Mechanical Engineers, the public knew little of what was taking place. This was as it should have been, for the early papers [1] which stimulated discussion and really crystallized and forced the concrete statement of principles and methods, later served as the substantiation of the most potent claim of scientific managers — namely that scientific management is not a *theory* evolved on paper by a more or less practical dreamer, but is the result, tho as yet imperfectly expressed, of carefully worked out solutions evolved by far-sighted and eminently practical managers and engineers to meet everyday problems. Such theory as has been developed was preceded long years by sound practice.

With the Eastern Rate Case hearings in 1911, however, came the second stage, the public awakening; and immediately succeeding it came a flood of popular articles, extravagant claims, and vehement denials. There was a mad scramble on the part of various owners of industries (possessing a lamentable lack of understanding as to what this new movement really was) to secure this "panacea," and of course an equally eager readiness on the part of incompetent and frequently unscrupulous charlatans to supply the demand. It is safe to say that had not such abundant evidence of the real value of the fundamental *principles*, properly applied, been available during this period, the inevitable

[1] Towne, "The Engineer as Economist," Trans. A. S. M. E., vol. vii, p. 425; Towne, "Gain Sharing," ibid., vol. x, p. 600; Halsey, "A Premium Plan of Paying for Labor," ibid., vol. xii, p. 755; Rowan, "A Premium System Applied to English Workshops," Proc. Inst. of Mech. Eng., March 20, 1903, p. 203; Taylor, "A Piece Rate System," Trans. A. S. M. E., vol. xvi, p. 856; Gantt, "Bonus System for Rewarding Labor," ibid., vol. xxiii, p. 341; Taylor, "Shop Management," ibid., vol. xxiv, p. 1337. Gantt, "Graphical Daily Balance in Manufacture," ibid., p. 1322; Barth, "Slide Rules as Part of the Taylor System," Trans. A. S. M. E., vol. xxv, p. 49; Dodge, "A History of the Introduction of a System of Shop Management," ibid., vol. xxvii, p. 720.

reaction would have been much more severe and of much longer duration. The fact that it was not is only another tribute to the (possibly unconscious) far-sightedness of the real leaders in the movement.

For there is no question that the reaction is largely past and that we are now in the third stage. This does not mean, however, that there is not still a tremendous amount of misunderstanding as to the real significance of the movement, or even a considerable amount of active opposition. The third stage is again clearly reflected in the literature on the subject. The popular matter has dropped out pretty completely and has been replaced by an already large and constantly growing number of articles dealing, on the one hand with concrete illustrations and explanations of the actual workings of the system or of parts of it, and on the other hand with frequently altogether healthy and well-intentioned, tho unfortunately not always well-informed, attempts to appraise its true economic significance. The active and open opponents, failing to find proof of the fulfillment of their dire prophecies as to the ill effects on the workman and the heartlessness of it all, have largely been driven to a less outspoken if more insidious activity, unwittingly furnishing tremendous arguments for the extension of what they sought to kill through measures forced on misinformed legislators in a vain attempt to stop the inevitable.[1] And incidentally, those of the

[1] I refer to the anti-stop watch and premium-payment riders to the Army Appropriation Bills. Before the Committee on Military Affairs on January 4, 1917, Brig. Gen. William Crozier, Chief of Ordnance, in discussing the Taylor System at the Watertown Arsenal submitted testimony in substance as follows, Hearings before the Committee on Military Affairs, Army Appropriation Bill, 1918, pp. 955–964; see also Congressional Record for February 1, 1917, pp. 2654–60: —

After the Taylor System had been in operation at the Arsenal a year or more a comparison of identical jobs showed that the men on the average did 2.7 times as much work after its development as they did before. In the machine shop where most of these jobs were done, the average increase in output was 2.2. (See decrease for this department upon abolition of premium payment, below). The work was more carefully done, of a higher quality. There had been to date of testimony, January 4, 1917, some

Taylor persuasion — upon witnessing the constant putting forth, by those either ignorant of or actually opposed to the Taylor System as such, of "new" and brilliant ideas in management, incorporated long since in the practices of that group — may be pardoned for an unseemly chuckle up their sleeves at the rapid and irresistible spread of the principles and methods for which they have long stood. Not only in current trade journals laying no claim to being scientific management disciples, but also in the practices of many managers, some of whom at least lay claim to being exactly the reverse, is this tendency most noticeable. Only upon coming in more or less close contact with numerous plants is this fact brought home so forcibly.

We may say, therefore, that the sensational and propagandist period is past, that the foisting of half-baked "efficiency" schemes on an unsuspecting and overeager public is rapidly passing (altho there are still, unfortunately, too many managers who give less attention to the selection of an industrial adviser than they give to the purchase of a new machine), and that the skeptical stage — the "my business is different" atti-

seven years after the system was inaugurated, no single instance in which a man had complained of overwork. The spirit and contentment of the men had never been so good as they were during the several years in which the system was in operation. For a number of years the average earning of premiums of the workmen, above the regular day wage which in itself was equal to that of other plants in the vicinity, was about 27 per cent of their pay.

By congressional action the use of the stop watch and the payment of premiums were abolished. A comparison of identical jobs done in many cases by the same workman both before and after this proviso went into effect shows in the worst case, that of a job done by the same man, that he took 4.2 times as long to do the work after premium payment was abolished; in other cases the ratios were 3.6, 3.0, 2.9, etc., with average ratios as follows:

Machine shop	2.2	times as long when not on premium
Foundry	1.6	" " " " " " "
Smith shop	2.1	" " " " " " "
Yard gang	1.8	" " " " " " "

The atmosphere of industry and application which was previously so noticeable changed materially, there was much more loafing and the men had no desire to exert themselves after premium payment was abolished. The earnings of the men of course dropped back to regular day rate, and the cost of manufacture was considerably increased.

tude — is gradually passing with the constant addition of new lines of industry to the list of scientifically managed plants,[1] and that we are now in a period of healthy growth accompanied by a much more sympathetic and truer understanding of the fundamental nature of the principles and problems involved. "Scientific management" has comfortably taken its place among the things which are here to stay.

It is perhaps a little early to attempt to judge of many of the economic problems raised by scientific management — the smoke of battle is yet a little too pungent, and we are not yet sufficiently removed from its beginning to enable us to get a true perspective of the movement as a whole. Whereas in the past, however, it has been necessary to speculate as to its *probable* effects on this or that phase of the problems presented, and even tho we may still justifiably concern ourselves in this manner with the numerous as yet unsolved questions, we can now, nevertheless, get a much clearer perspective than has been possible heretofore and perhaps more profitably focus our attention on the *positive* aspects and accomplishments in certain directions, realizing that it is no longer theory but facts with which we are dealing. If the writer succeed in crystallizing a few of the accounts on the debit side of our balance sheet by bringing together some of the concrete economic losses already eliminated or alleviated by scientific management, it may perhaps make easier our minds as to the state of the science as a whole.

In considering the effects of scientific management from the standpoint of its positive contributions to industry we may take up first the mechanical phase — the more purely impersonal aspects — divorced so far

[1] Cf. C. B. Thompson, "Scientific Management in Practice," Quarterly Journal of Economics, February, 1915, p. 262, in which eighty-three different industries are listed since which time there has been a noticeable increase in the number.

as possible from considerations of its direct effect on the individual, leaving the human factor as the last and most important topic. The two are to a certain extent interactive, yet sufficiently distinct to warrant separate treatment.

II. The Mechanical or Impersonal Aspects

A. *Increased Production*

Turning first then to the effects of scientific management on industry as such, as exemplified by those establishments directly affected by it, by far the most striking single fact is the *increase in production* it has effected with the same equipment and personnel. This has occurred in many cases to such an extent as to be almost unbelievable. Ten, twenty, thirty per cent increases are the rule, and an output twice or even three times as great as had formerly been secured is not uncommon. And these results have not been uniformly secured, as might be supposed, from plants that were near the lower level of efficiency before the development of the system was started. On the contrary, in many cases the standard of production was comparatively high, and I know of one case where the production was increased over 60 per cent in a plant which from every standpoint was previously generally considered to be absolutely the most efficient of its kind in the country. The desire for increased production is often, indeed, one of the minor causes for the management's determination to have scientific management — too often the output is greater than ever before and yet the firm through other causes is losing money, or conditions are unsatisfactory in other respects.[1] But in just that same plant when scientific

[1] Witness a recent demand on the part of workmen in one large shop for the initiation of time study as a means of more accurate rate-setting.

management *is* developed, the output is almost sure to increase — incidentally as it were.

Increase in production has been the cry of economists for centuries, and for centuries they have had their cry answered — at least partially. For it is the exception where, take any industry you will, with the *constant substitution of new and improved labor saving machinery and equipment* the output has not been very largely increased over what it formerly was. Our industrial highway is strewn with the corpses of those individuals who would not or could not keep abreast of these improvements.

Such increases, however, altho they may enable the individual to survive, may not and often do not wholly satisfy economic demands. They are brought about by the *substitution* of new machines for those already in use, oftentimes long before the latter have earned their keep. I heard of a case where recently in one department, new machines costing thousands of dollars and having been in use less than one year, were scrapped to make way for new and supposedly superior machines.

The increase in production brought about through scientific management, however, is of a fundamentally different nature. True, the scientific manager does not tolerate obviously antiquated machinery, but he does not tolerate inefficient machinery of any kind, and it is just here that his real economic contribution comes in. With him it is not a case primarily of increase in production through new machines; it is first and foremost a case of increase through *getting the most out of existing equipment* and personnel. Only after present means are brought to their highest productiveness may the question as to whether new equipment is justifiable be satisfactorily determined. With the present mania for new equipment, we may well inquire whether, in very many cases, these changes do not impose an added rather

than a lessened burden on the consumer. If a proper charge for such rapid obsolescence as well as a regular charge for depreciation were figured into the expected cost resulting from the contemplated "improvement," and particularly if this expected cost were compared not with present costs with existing equipment, but with what those costs *should be*, it is safe to say that many new machines would go unbought, that many firms would avoid bankruptcy, and that the owners as well as the buying public would profit thereby. It is just here that the line between the two kinds of increases may be sharply drawn, which brings us to the consideration of the financial aspect of the question.

B. *Decreased Cost*

For all practical purposes the consumptive capacity of mankind as a whole may be considered to be unlimited. Yet not infrequently there has occurred a state of so-called "overproduction" in one or more widely consumed lines of commodities. This apparently anomalous state of affairs will be found, upon analysis, to be due not to overproduction as such — not to a simple cessation of demand because of satiated desire — but to a conviction on the part of the consuming public, that *at that price* under existing conditions the commodity in question no longer yields the demanded return for money invested in it. What was formerly exchanged for this commodity now goes elsewhere where the equivalency is considered to be more attractive. Lower your price on this one commodity, however, and see what happens: — the balance of equivalency just established is again disturbed, the commodity now immediately represents a relative increase in return, those articles which before replaced it are now themselves re-

placed by it, and we get back at least to the original state of demand with possibly an added demand. Continue to lower the price, and this commodity will continue to edge its way into favor, constantly disturbing the balance and in constantly widening circles continuing to replace other articles which we deem, in comparison, as of lesser utility.

It would then seem clear that a simple increase in production without at the same time a decrease in unit cost (and therefore, in the long run, in selling price) cannot of itself in the great majority of cases be considered an economic gain [1] and may at times lead to a direct economic loss — overproduction. Furthermore, a simple increase in production with an accompanying decrease in a cost which, due to inefficiency in management, was hitherto higher than it should reasonably have been as judged by modern standards, may not and usually does not wholly satisfy economic demands. It is only erasing the negative and getting back to par, as it were, but failing to add a plus.

Where the increase in production and the decrease in already satisfactory cost go hand in hand, however, our gain is direct and indisputable.

It was for this reason that the distinction above was drawn, and it is on this ground that scientific management may lay just claim to a more favorable economic judgment than the prevalent increase in production brought about through new equipment which may not be economically justifiable. With its insistence on present efficiency before new equipment is permitted, which with its accurate cost system furnishes a basis for determining the effectiveness of contemplated substitutions,

[1] I am not considering those rare instances where an increase in production with decreased cost may be an economic *loss* (in the case of whiskey, e. g.), nor where an increase in production even at a decided increase in cost may be a distinct economic *gain* (in the case of food shortage, e. g.). Such cases are altogether exceptional and have no practical bearing on the present discussion.

scientific management has a very much firmer foundation upon which to rest its claim. It of course has also the absolute reduction in cost in addition.

Of the various *means* by which scientific management increases production and decreases cost, some — such as the selection, fitting and training of the workers, the reducing of labor turnover, absences, lates, etc., the determining and securing of a proper day's work and the paying of a correspondingly increased wage — are distinct economic gains in themselves. These will be discussed under the human factors. Others, however, must be considered simply as the elements which go to form the most outstanding contribution of scientific management under this head — decreased cost — and as such several merit discussion here.

1. *The Use of Equipment.* Closely connected with the question of new equipment referred to above, is that of the full utilization of that now on hand, using the term in its widest sense to include all facilities of production.

A certain amount of idleness of equipment is of course unavoidable. That it should be even one-half of what it unquestionably is, however, is a striking commentary on the lack of foresightedness of many managements. The encouraging feature about it, however, is that a large proportion of idleness can be prevented and that a few progressive managers are informing themselves and taking effective steps to remedy the evil. Less encouraging is the fact that the extent and seriousness of the losses through idle equipment are seldom appreciated by the manager until it is brought forcibly, even violently, to his attention through cold figures. In comparatively few plants is a record of machine time regularly and systematically kept, and in still fewer instances is the effort made to determine in each case the exact cause

of idleness upon which to base intelligent remedies. If, as advocated by Mr. Gantt,[1] each manager could be shown that during the last two months a certain group of machines was idle say 40 per cent of the time, and that this idleness was distributed as follows:

TOTAL IDLENESS		40 %
Unavoidable breakdowns		3 %
Avoidable breakdowns		12
Lack of work at machines		15
Lack of orders for product	0	
Lack of materials	4	
Unbalanced equipment	6	
Poor planning	5	
Lack of help		10

and if in addition the money loss from each cause could be shown, measures to reduce the idleness would follow almost as a matter of course. Nothing is more common than an abundance of room in what was previously a very much crowded and overburdened department after steps have been taken to balance, rearrange, standardize and maintain equipment, and it is not unusual to hear of a whole contemplated addition to a plant being found entirely unnecessary and consequently abandoned upon the presentation of such statistics as those cited above — a direct saving of usually thousands of dollars, to say nothing of the avoidance of actual loss (through decreased production or increased costs) which many times occurs with an enlargement of plant.

Just why such conditions exist it is hard to say. Attention to such matters should be one of the main duties of the manager. And with a table such as the above, he would soon make them his principal duty. Yet, even

[1] H. L. Gantt, "Productive Capacity as a Measure of Value of an Industrial Property," Trans. A. S. M. E., 1916.

under present conditions, it seems so much easier to order new equipment, blame the seller for such slow deliveries that our production is held up, and overlook the fact that by the aid of such facts the way out lies right under our noses. The answer probably lies somewhere between our natural aversion to real thought and planning, and the fact that the prevalent forms of organization keep the manager so hemmed around with ordinary routine that he is left no time in which to conceive and execute manifest reforms. The exception principle in management emphasized by Mr. Taylor, merits a much wider application on the part of most of our executives.

2. *The Use of Labor.* Unlike an idle machine, there is of course no such thing as an absolutely idle man permitted in any plant, yet a man who, before thoro time study and planning might be considered to be extremely busy — as indeed he might be, tho perhaps inefficiently so — in the light of highly systematized working conditions would be thought of as having been previously very ineffectually employed. The term "idle" is becoming a relative one. In general, except as the human element, to be discussed, enters here, the same conditions as pointed out for idle equipment are applicable in this case, and for the present the two may be considered as of like nature and effect. Taken together they constitute the most tangible field for reducing costs.

3. *Material Control.* The stores system in a scientifically managed plant is typical of the minute control designed to be exercised over all departments of the work. It is designed to cover the four factors covering the efficiency of material use: Quality, Quantity, Time, and Cost, and great care is taken to maintain the proper balance between these four interdependent variables so that their resultant effect will be the best for any given case, all things considered.

It is not the purpose of this general review to go into a description of either the methods or the exact results of the various means by which modern management's economic contributions are made. To do so, even for the present topic, would require volumes. Only the broader features can be briefly touched upon. In general it may be said that the principal losses in the materials field occur on the one hand through oversupply, and on the other through undersupply; and curious as it may seem, losses from both sources occur most often in the same plant.

It is the exception where the cost of installation of the stores system does not pay for itself by immediate savings effected, and in many cases these savings arise largely through the elimination of surplus stock and useless varieties, and through effecting a more rapid turnover. In fact, reports as to the amounts of junk disposed of in various plants upon the development of the stores system would be almost unbelievable to one who has not had first hand contact with this work, were it not for the records supporting the statements. Tons and tons of supplies — ordered by the foreman for the expected rush which did not materialize, parts lost or rejected in process, duplicate orders uncaught, "rainy day" and spoiled parts cached by the workman, wrong material delivered and not sent back, parts for discontinued products, and fantastic variations from standard — all accumulate in the storerooms or at various odd places (including valuable working space) throughout the plant, until a detailed study of production requirements leads to a wholesale housecleaning. Immediately and almost invariably, the inventory of stores which it is necessary to keep on hand is decreased, releasing idle capital. This capital invested in turn becomes more productive through more rapid use.

The experience of the Watertown Arsenal where, upon the development of the system, the savings in one year resulting from the use of *surplus* stock amounted to $122,789.61 is typical of many, many plants in this respect. Similar instances could be multiplied almost indefinitely.

Looking behind such conditions we readily see not only the general disorganization and lack of knowledge thus typified, but also the large amount of capital tied up, the inevitable depreciation and deterioration of stock, and the general interference with the flow of work in productive processing. Add to this the elimination of the generally rapidly disappearing annual or semiannual shutdown for inventory taking, and the sources of the large savings become apparent.

Similarly, lack of the proper material at the right time is frequently the cause of expensive delays, postponed delivery dates and even loss of trade. Here again a certain amount of lost motion is unavoidable; but that four-fifths of the current inconveniences and losses experienced in material handling can be eliminated by detailed knowledge and proper planning is proved by those scientifically managed plants which have systematically attacked and regulated stores problems.

4. *Routing.* The decreasing of costs through the full utilization of equipment, of men, and of materials has been discussed. Another of the means by which this reduction is secured is the broader use and correlation of the business as a whole, including both the physical layout and the administrative control of the various component parts of the business.

Just what is meant by this topic, as well as its significance, may be illustrated by an example. In modern or scientific management a factory is looked upon from the

strictly production standpoint as comparable to an automatic machine. Just why this conception is necessary may be seen from considering a compound full automatic consisting of five successive components, A, B, C, D, and E. As a piece is completed in any one of these parts, it is automatically swung around to be further processed in the next, and obviously that next must be free of its previous piece and ready to receive the new. Properly to set up such a machine of course requires detailed knowledge of and strictest attention to the time element for each head.

Now, a great many plants are being run today without an appreciation of the fact that the various departments of the plant as a whole are exactly analogous to the various parts of the automatic machine. The result is very much like the result would be if the automatic were set up either by one man who lacked or disregarded knowledge of all parts except that he was working on at the time, or by two men working independently without the knowledge of what the other had done, was doing or expected to do. In the case of the machine its various parts simply must be correlated and brought into proper synchronism by one man or by concerted action if by more than one; the same thing is less obvious but equally true in the case of the interdependent departments of the manufacturing plant if equally satisfactory results are to be expected. The "set up" and regulation of the various departments of most factories is an exceedingly complex and technical undertaking commonly defined by the term "routing," and not for a moment can any one foreman be allowed to run his department as he sees fit regardless of its relation to other departments and to the business as a whole. Hence the insistence in scientific management on a somewhat elaborate Planning Department, or at least

on a central control of all activities which in any way have an interacting effect, and conscious and constant effort is put forth to secure this central control. As perhaps the finest example of the practical application of what has here been incompletely described, reference is made to the work of G. D. Babcock in the plant of the H. H. Franklin Manufacturing Company.[1] Suffice it here to emphasize the point that such control is the cardinal aim of every scientific manager, more or less perfectly realized in the best shops and secured through the systematic collection of all relevant information and through the practical application of this knowledge through measures collectively known technically as "control." This control is established through the proper use of such measures as standardization, time study, logical layout, careful routing of work and first-piece inspection, mnemonic symbols, the Order of Work and the Bulletin Board or its equivalent — all mechanisms which, in one form or another, have become integral parts of modern management.

5. *The Regularizing of Production.* Perhaps nowhere better than in the elimination of seasonal production and its attendant evils is the fact illustrated that what is of permanent benefit to the management also benefits the workmen, and *vice versa.* It would in fact in this case be difficult to say to whom the larger benefit accrues — to capital and the consumer through full and continuous use of a minimum of plant, equipment and personnel, or to the body of employees through full-time employment and regular wages. Operation under conditions of seasonal fluctuations is a direct economic waste to the community, and that in very many cases it is not an unpreventable waste has been amply proved by those industries which have attacked and eliminated

[1] Babcock, G. D., The Taylor System in Franklin Management.

the evil. It would of course be folly in this case as in so many others to claim any monopoly of effort along this line for scientific management plants — the case simply illustrates what may be accomplished along so many lines by what scientific management does make it a *definite policy* to do: a policy of conscious and continuous *taking thought* of the numerous economic and social factors which make for permanent success.

C. *Improvement in or Maintenance of Quality*

Next to increased output and decreased cost, the question of quality of output deserves attention, for obviously, while in cases improvement in quality may be justified even with decreased production and increased costs, the reverse would infrequently be the case.

That the increases in production under scientific management have not been secured at the expense of quality would seem proved, if proof were needed, by the permanence both of those increases and of the firms which have secured them, and will be questioned by no one acquainted with the facts. As a minimum, the maintenance, at least of the engineer's " good-enough-is-best " quality, must be the first concern of those who expect fully and permanently to benefit by modern methods of management. It has remained largely for the time study man and the instructor, supported by proper quality bonus and thoro inspection, however, to prove that as between speed and quality there is not only no intrinsic irreconcilability, but indeed that with intelligent handling an improvement in quality usually accompanies increase in speed. Just why this is so may be left largely to the psychologists — we are here dealing simply with the abundantly proved fact.

D. *Speedy Production and Accurate Delivery*

It must never be forgotten that any industry, to remain in operation, must produce a profit. When it ceases to do so it loses the support of the investor and must perish. As a corollary to this it must be borne in mind that investments in plant, in materials, and in labor become bills receivable only when the finished product is shipped from the factory door. This shipment date then becomes one of the vital points of contact between seller and buyer — the earliest point ordinarily at which *expense* becomes convertible into *profit.*

The quoting of a minimum time necessary for delivery after the receipt of the order and the strict adherence to the specified delivery date are two commonly unappreciated factors in business success. From the buyer's standpoint they are outranked in importance only by quality, and oftentimes not even by that quite frequently intangible and relative characteristic. As between two reputable firms whose selling prices are not at too wide variance, the duration and definiteness of the time for delivery become governing considerations, and not infrequently indeed delivery outweighs both quality and price. The firm which, on a basis of knowledge and through the systematic measures of control discussed above, can accurately predict and rigidly maintain delivery dates is not only in an enviable position from the buyer's standpoint but may claim a distinct contribution to itself, to the buying public, and to the community at large.

For every cessation of processing operations for lack of material, every delay due to machine breakdowns, every loss of production due to discontented or absent workmen — every interference with high production

from whatever cause in our factory — is an economic loss; every failure to meet scheduled and attainable delivery dates (regardless of whether thereby the purchaser's schedule is also upset for in any event *our* turnover is less rapid than it should be and our costs must be higher than they should be) — every performance below a standard which, as gauged by current and freely available modern practice, may be reasonably expected and justifiably demanded, is an economic loss which must ultimately be paid for by the consumer.

The quickening of production and the consequent increase in rapidity of turnover, the informed and detailed control of work in process, and, resulting from these, the quoting of a quick and dependable delivery date — these factors characteristic of properly managed plants together constitute a decided antidote to the tendency for ever increasing costs of living.

E. *The Power and Stimulus of Knowledge*

As a final consideration under the industrial or non-human aspects of the discussion must be mentioned, partially by way of summary, the numerous factors which considered as a whole form the possibly less tangible but nevertheless eminently comforting features of operation under scientific management. I refer to the confidence, the sense of security, the power and stimulus, the aplomb which springs from the knowledge that we have *real control* of our business through the ordered regulation of its activities according to adequate knowledge and best practice — one of those by-products of Scientific Management which are often of such transcendent importance.

There is something immensely stimulating about it all, something akin to the inspiration and confidence we

feel when in the presence of a man who is a master of his subject and whose opinions and actions we know are based on thoro knowledge and thoro understanding. Who has not experienced the enthusiasm which comes with the final solution of an intricate problem; who has not experienced the stimulus of directing interdependent forces in perfect confidence toward a solution which, be what it may, we know must be the proper one because arrived at through absolute adherence to natural law. In the one case it is the enthusiasm of the chemist when he knows he has ferreted out a new element; in the other it is the confidence and the power of the master at his work.

This enthusiasm, this stimulus is nowhere more infectious than in industry. Striking proof of this is afforded by the avidity with which the " efficiency " gospel has been bandied back and forth between adherents and opponents during the eight or nine years it has been public property, and by the readiness with which very many of the largest and most progressive firms in the country have accepted and successfully applied the principles of modern management. It is fortunate that this is so, for in the search for and utilization of better methods wherever found lies the hope of American industry. The metal working industry generally has been tremendously spurred forward not only by the development of high speed steel, but also by the example of those plants which have not been content with being forced to adopt this means of increased production but which have voluntarily followed this measure up with others of far-reaching importance, and who have thereby postponed in their cases the time of diminishing returns. Tho lacking the same stimulus, there are increasing signs that the textile and other industries are shortly due for a less revolutionary yet none the less peremptory

awakening. They also must catch up with the, as yet, comparatively few examples of advanced management among them.

The fear of the power of knowledge even more than that of the power of capital may well cause competitors to demand forthwith a balance sheet of knowledge. Tho capital is needed to put knowledge to work and to keep it there, capital without knowledge is likely quickly to disappear in competition with those who possess both. Knowledge without capital is a stronger asset than is capital without knowledge, for knowledge may be capitalized while capital cannot be educated. We may well pause to consider our probable future status when our competitor and not ourselves is one who knows how long work should take; who knows the capacity of each machine, of each department, and of his plant as a whole, and who takes measures to see that these various factors are properly balanced; who has worked out, standardized and reduced to permanent form the best methods of performing work; who really knows costs (as far as from their very nature they may be known) and knows at how low a figure he can sell in dull times and still make a profit or secure more work to keep his organization and plant intact even at no profit, and who knows when he does quote a specified selling price whether he is losing money on the sale or not. We may well consider our relative positions when he is the one who knows that there is no inherent inconsistency between wages plus and cost minus, because he knows, appreciates and acts on the fact that "maximum prosperity for the employer, coupled with maximum prosperity for the employee ought to be the two leading objects of management." Such a competitor, we know, really *controls* his business and has a check on its efficiency — we are but alchemists, he is the chemist of industry.

III. The Human Factor

Just as increased production may be frowned upon if unaccompanied by decreased cost of the product and either of these may be censured if thereby quality is allowed to suffer, so none of these accomplishments can be commended or tolerated if at the same time labor — the human element — be not kept in satisfactory adjustment and correspondingly benefited.

Important tho it be for the country at large that we have high production and low costs, that we establish a strong industrial basis, it is of greater importance that while we are making *things* we do not forget that our first and infinitely more important duty is the making of *men* — of good citizens.

Scientific management has from the first been a storm center around which questions of labor have raged. Because of its effects in so many particulars on human relations it must continue to be so.

Time and space might profitably be given to showing how, in the evolution of scientific management, more and more emphasis has been placed on the necessity of maintaining just human relations and of promoting the best interests of all concerned; how the very structure of the mechanism itself is designed to safeguard, to increase and to satisfy those interests; how its very nature is such that, so far from militating against those interests, it is vitally dependent for its very continuance on a proper maintenance of them. Certainly such considerations must prove of vital interest and concern to anyone who deplores and looks beyond the present troubled days. Profitable and interesting as such a story might be, however, I believe it to be still more profitable and pertinent to summarize, even somewhat categorically,

some of the specific accomplishments known personally or through reliable authority which show in concrete cases the embodiment in actual practice of the theory and principles of scientific management. A theory may be ever so beautiful in the abstract; to judge of its soundness we must examine its results in practice.

Before turning to the discussion of concrete cases, it should be remembered that in considering the relations between industry as such and the individual, one is dealing with questions of tremendous significance and complexity. Many of the unsatisfactory conditions under which we work today are heritages of an age long past, just as many of the more satisfactory conditions today are in turn the successors to those once less satisfactory. The massing of workers, the economic dependence of the employee on the employer, the specialization of processes and the minute subdivision of labor, the aggregation and power of capital — the problems and ills of the individual arising through such factors have not, as is sometimes intimated, been brought on *by* scientific management; they are inherited problems and abuses with which, in common with other agencies, scientific management must deal. There is and can be no panacea for industrial ills — industry is not such a static thing as to make possible any such consummation. No movement can be justly judged from this standpoint — it must be judged according to the vigor and success with which it attacks and solves or ameliorates such unsatisfactory conditions as it may encounter under given circumstances. In the case of scientific management then, our inquiry must be, not whether it has completely solved partially unsolvable problems, but whether it is entitled as its exponents claim to be ranked as a movement which, as a cardinal principle makes a vigorous attack upon these problems

a definite part of its policy, and which is in fact, perhaps more than any other one agency contributing in a substantial degree to their satisfactory adjustment. It is from this standpoint that the following discussion is offered.

A. *Industrial Peace*

It would be impossible to say to what one feature the freedom from "labor trouble" characteristic of plants operating under scientific management has been most due. Certainly no one feature in itself has brought this about, and probably not any one feature has been most potent, for high wages is by no means everything for which the workman looks to the management. The absence of labor unrest is due undoubtedly to a combination of causes — to increased personal individual production and improvement in quality with the resulting personal satisfaction; to high wages unaccompanied by overexertion; to individual and impartial opportunity, assistance, recognition and reward; to an adequate machinery for the speedy adjustment of grievances; to conditions of work, of pay and of opportunity measurably better than the labor union in neighboring plants of the same type has been able to obtain and at the same time to an absence of ultra "welfare work" and similar measures which smack too much of paternalism and which tend, the workers feel, unduly to lighten the weight of their pay envelope. It is due to a spirit of coöperation — the "mental revolution" which is such a vital part of scientific management — to fair dealing, to a proper work environment, to a spirit of democracy, and to a feeling on the part of the employee that his best interest is being and will be looked after. It is due in fact, to the various factors discussed above and yet to be discussed considered collectively — it is inclusive of them all.

Summarize the causes as we may, however, the fact remains that in scientifically managed plants there has been remarkable freedom from the turbulent and distressing manifestations of industrial maladjustment characteristic of the last four years. It would be too much to expect that they could entirely escape the epidemic of industrial unrest, but it is extremely significant that, so far as is known through broad inquiry, such disturbances as have occurred have been of an altogether minor character, quickly and satisfactorily adjusted.

This fact is of preëminent importance at the present time. It is unquestionably *the greatest* contribution of scientific management — all the more so because secured, not as industrial "peace" was secured during the latter period of the war by governmental *suppression* of the disturbance of industrial conditions by either labor or capital, but by *coöperation*, justice, and fair dealing.

B. *High Wages*

It has sometimes been claimed that, in the cases of certain profit sharing and other measures, daily wages have been depressed below the market rate in the exact ratio in which profits were to be shared. Whether the claim is well founded does not concern us here. So far as the writer knows, this accusation has never been laid at the doors of Scientific Management. That it is not likely with justice ever to be is due to the dependent relation between daily wages and output. Starting with a current base rate of pay and the normal amount and quality of work customarily delivered by the operatives for that pay, scientific management first takes measures by which that production or that quality, or both, may be increased. Having thus provided the possibility of

higher and better production, it then offers, as a matter of justice as well as of necessity, a correspondingly increased incentive for its accomplishment, payable at once regardless of whether or not during any given period a profit is made on the business as a whole. Each is necessary to maintain the other, and the increased wage is solely dependent on and must follow immediately, not precede, increased output.

Increases in the earnings of operatives working under scientific management are too common and well known to need repetition here. Bonus percentages, above the prevailing market rate of wages, vary from 20 per cent to 40 per cent or higher depending on the character of work, and on the average are earned on from perhaps 70 per cent to 90 per cent of the jobs worked upon.[1]

That the more progressive managers are beginning to question the prevalent empirical bases of wage determination and to seek for a more satisfactory basis is evidenced by an attempt on the part of several of them to reduce to formulae the effects of various factors previously wholly neglected or only empirically estimated. Thus Babcock [2] takes into account the following factors:

1. Rate of production.
2. Cost of living.
3. Number of processes workman can do.
4. Years of connected service.
5. Fixed charges rate per hour which man has chance to modify.
6. Percentage of premium earned.
7. Late or absence record.
8. Spoiled work.

[1] For typical records see Hearings before Special Committee of the House to investigate the Taylor and other Systems of Shop Management, vol. iii, p. 1502; Congressional Record, February 1, 1917, pp. 2655–57; Thompson, S. E., "Development of Scientific Methods of Management," Trans. A. S. M. E., vol. xxxix, p. 123.

[2] Babcock, G. D., The Taylor System in Franklin Management.

9. Percentage of time under task.
10. Coöperation and conduct.

Such an attempt shows careful consideration of one of the three most important things for which the workman looks to the management: wages, conditions, opportunity.

Since the present paper is designedly little more than a synopsis of conditions as they are, it would be inappropriate to prolong it into a discussion of the various interesting social and economic aspects of scientific management as related to the wage question as a whole. It must suffice here to emphasize the undoubted fact that scientific management is leading the way both in the actual payment of wages higher than the general market level and in attacking some of the deeper fundamental phases of the problem.

C. *Proper Working Hours*

Mr. Taylor was one of the first to recognize and to prove the fact that overlong working hours are not conducive to high output, and that in very many cases hours of work may be sharply decreased *up to a certain point* and output increased simultaneously,[1] this point having to be scientifically determined for each class of work. The policy of reducing excessive working hours offhand, and of continuing thereafter to reduce them to a point not inconsistent with maximum gross output, has been consistently followed by his associates,[2] and scientifically managed factories as a body today are operating under at least as short hours as any other

[1] For instance, see account of his early work at the Symonds Rolling Machine Company, Shop Management, paragraphs 195–210. The same thing has happened in numerous other cases.

[2] See Thompson, S. E., "Development of Scientific Methods of Management," Trans. A. S. M. E., vol. xxxix, p. 123.

group of plants, while excessive hours on the part of any of them are unknown.

When one stops to consider it, it does seem rather remarkable, not to say significant, that scientific management presents such a uniform history of simultaneous increase in output, increase in quality, increase in wages, decrease in working hours and decrease in costs in those plants where it has been developed. Such is its record, nevertheless, in dozens of applications. It has ceased to be a novelty and is now the expected thing.

D. *Conditions of Work as Related to the Health and Well-Being of the Worker*

Looked at from a perfectly cold-blooded standpoint the return on the investment in the upkeep of the efficiency of the human machine exceeds that on the investment in the upkeep of the mechanical product. A moment's reflection will show why this must be so, for under proper conditions the human mind and heart delivers a *plus* which the inanimate machine is incapable of. From the entirely personal, selfish financial aspect, then, there can be no question that the very best condition for the employee is the very best condition for the owner of the business. And by the word "best" is here meant what is really best for the workman in the long run: wages neither too low nor too high, hours neither too long nor too short, general treatment neither too degrading through neglect or abuse nor too emasculating through ingratiation or paternalism.

From the purely economic standpoint, furthermore, this condition is equally true. It is economically wrong to allow the human machine to work under unsocial conditions of long hours, low wages, poor working conditions, unfair competition and lack of free scope for the

proper exercise of one's individual abilities, because under such unsocial conditions best results are not obtainable from human beings. A prematurely incapacitated workman, much more than an inefficiently employed one, is a direct financial loss to the industry and a direct economic loss to the community.

But it is particularly the social and ethical aspects of the question which I wish to emphasize. That the owners and managers of plants under scientific management recognize and capitalize that source of additional personal profit is true; that they consciously consider their economic obligations may or may not be true; but that they primarily and continuously have the best interests of their people at heart, not from any ulterior motives but because they are that sort of person, I believe can be doubted by no one who will take the trouble to visit them and their employees. They would otherwise never have achieved scientific management — for scientific management is distinctly a thing to be achieved; it cannot be purchased and it cannot be had or maintained without this attitude.

One would naturally expect, therefore, to find in such plants satisfactory conditions as regards accidents, health and sanitation, the speedy and impartial adjustment of grievances, and comfortable working conditions generally. The providing of such necessities follows almost as a matter of course. In addition are found also in varying degrees of completeness rest and recreation rooms, playgrounds, libraries, lunch rooms where necessary operated at cost, first aid hospitals, etc., on an unpretentious scale according to strict utility. Such measures, if initiated upon actual need and if properly regulated, are appreciated by the employees and express the good will of the firm toward them. Then, as a step further, there are the mutual benefit societies and

insurance and retirement funds which were initiated by Mr. Taylor very early in his work and which are very characteristic of plants following his lead as well as of many others at the present time.

There is another phase of this question, however, which is of much greater importance than most of the measures enumerated in that it affects the workman during his entire working hours while he is at the machine and for his entire life as a productive member of society. While it is important to provide means for caring for him during temporary sickness or disability and after he has ceased to be productive, it is at least equally important that his period of usefulness be safeguarded and prolonged through attention to his daily work. This is accomplished through the determination of " the best day's work that a man could do, year in and year out and still thrive under." The object of time study is just this — the determination of a proper day's work which, through allowance for rest and necessary delays, the workman may do year in and year out and thrive under. The setting of a task either too high or too low is equally shortsighted, since the object for which the study is made is thereby defeated. As a vital part of the determination of such a task is the investigation of the tiring effect on a workman for each class of work, investigations commonly described today by the term " fatigue study."

It is significant that the first " fatigue study " ever conducted in a really thoro and scientific manner, so far as the writer's records show, was performed over thirty years ago by Mr. Taylor as a part of his determination of a proper day's work.[1] Indeed, so far ahead of the time was he that, except as embodied in the routine of current time study according to the methods he and his

[1] Taylor, The Principles of Scientific Management, pp. 53–59.

associates developed and insisted upon [1] these early researches seem until very recently to have been generally overlooked until the admirable work of the British Health of Munition Workers Committee served again to emphasize their importance.

And, in closing the discussion of this topic, it may be stated that, in spite of the oft-expressed fears on the part of various estimable gentlemen that the so-called "speeding up" would result to the immediate or ultimate detriment of the worker, no authentic case of anything but beneficial results has been brought to light.

E. *Selection, Fitting, and Training*

It would be difficult to overestimate the advantage both to the individual and to the nation of a condition where each person could be engaged, under conditions satisfactory to him, upon work for which he is naturally best fitted. The misfits in industry are the causes of a direct loss of thousands of dollars annually, and of a loss of initiative impossible to appraise and of far greater importance. In the first place it is an economic waste to hire a workman who is not fitted for the work in hand. This waste is not always avoidable or even to be avoided under all circumstances, however. In the second place, after a man is hired he must be quickly trained to his full productiveness or transferred without delay to work on which this will be possible. He must in the third place, both for his own sake and for that of the management, be taught to do several different operations if possible (see Babcock's formula, item 3, page 491, above), and finally in the fourth place he must be given an opportunity to measure up to his full abilities as he proves, by

[1] See Merrick, D. V., "Time Studies for Delay Allowances," American Machinist, June 21, 1917, p. 1061 (and preceding articles) where carefully worked out charts show proper allowances for rest and delays under various conditions.

careful and impartial records, that he can assume increasing responsibilities. It is a direct loss to employ a man on work for which he not fitted, or to fail to take advantage to his full ability. The human scrap heap of discouraged, discontented and worn out men is but a sorry return for our modern industrial system.

If we believe that " for each man some line (of work) can be found in which he is first class," it imposes upon us the duty of acting in conformity with our belief. In addition it is sound business. Committed from early days to a policy of " scientifically selecting, training, teaching, and developing the workman," in plants adhering to this principle it is the customary thing, therefore, to find operatives who are now doing excellent work on their third, fourth, or even fifth trial after having previously been unsuccessful at work for which even they originally thought they were best fitted. We naturally expect to find, and do actually find, numerous cases of promotion from the ranks. Starting with the original functional foreman inappropriately called the disciplinarian, now developed into the modern functionalized Employee's Department (known variously also as the Personnel Department, the Labor Department, the Employment Department, etc.), there is set up not only a means for bringing to pass such conditions as those described above, but also a means to establish and maintain a more intimate personal touch between management and men, and to modify or counteract the tendencies on the part of the foremen and the production officials generally to press for high production regardless of the best interests always of the individual, and on the part of the employees to go to the other extreme. This department is so constituted that it sits in judgment over the employee on the one hand and the management on the other — acting as buffer, as it were,

between the two. The very recent widespread adoption of this safety valve is a decided step in the right direction and has far-reaching possibilities in capable hands.

F. *Free Scope for Individual Initiative and Opportunity for Advancement*

"Democracy in industry" has been defined as existing where conditions are such as described in the above title. Whether we agree that this is a sufficiently comprehensive viewpoint or not, certainly this degree of "industrial democracy" should constitute the minimum for which we should strive, and is necessary for true progress. And yet even this amount is extremely difficult to obtain in modern industry, even with the best intentions in the world. Opportunity may be abundant, yet there are so many unmeasurable elements to be considered in determining advancement — so many questions of judgment and of personality and of circumstance. The best one may do is to do the best he can, in fair-mindedness and in impartiality.

Monotony, where monotony exists (for there is ample evidence that many for whom in their "deadly monotonous" tasks we are prone to feel compassion, do not at all envy us with our larger responsibilities), is due not so much to the unvarying repetition of recurrent operations as to the accompanying feeling that the work holds no future possibilities. Introduce the possibility and the probability of a more attractive future, and the humdrum task becomes but a stepping stone, seen in its proper relation to the whole scheme of things and eminently serviceable and satisfactory as a present means. The belief that each of us has a marshal's baton in his knapsack is no less stimulating today than it was

in Napoleon's time, and the conviction that we have reached a position of status is no less deadening.

Difficult as it is, therefore, it is nevertheless vitally important that the channels of advancement be kept open and that every incentive and opportunity be given a man for bettering his position. As possibly the most effective avenue through which this is accomplished in scientific management is functional foremanship. The requisites of the customary "line" foreman are so numerous and of such a nature as to preclude from that position all but the rather exceptionally gifted workman. Functional foremanship, by dividing among several foremen the duties ordinarily expected of the one, introduces greater opportunity for the man of limited or specialized talent and at the same time does not lessen the demand for those of greater or more balanced capabilities.

For the most part, since this topic is so closely allied to the preceding one where the provision for definitely teaching and guiding the employees was discussed, little additional emphasis is needed here. Before passing on, however, a prevalent fallacy in regard to the limitations placed on personality in these plants should be noted. The idea is frequently expressed that in working under highly standardized conditions and with detailed instruction and supervision from above in regard to methods, there can be little chance for the exercise for one's individuality.

I believe it has been conclusively demonstrated in practice that scientific management is decidedly a *dynamic* movement, governed not by inflexible methods and case-hardened mechanisms, but solely by *principles*. There have certainly been new developments from time to time sufficient to prove that there is a ready acceptance and adoption of better ways immediately they are

proved. But, and here is the point, they must be *proved*; for it is no less a waste to be constantly upsetting carefully worked out methods upon the insistence of those who, because they have not first mastered present ways, have little right to an opinion at all as to their relative efficiency, than it is to refuse to adopt new and better ways when they are found. We do not and it is right that we should not let a novice tamper with a new and delicate mechanism until he has proved that he has mastered it.

The complaint to this extent, therefore, is well founded. It is not individuality and initiative run wild, however, which is really constructive; it is intelligently applied individuality, and prerequisite to this is an understanding of things as they are and why they are so. Founded on laws based so far as possible on *fact* from whatever competent source obtained, and administered through a democratic form of organization which draws its various functionaries from the ranks of the workman, scientific management embodies "management sharing" on a basis and to a degree infrequently encountered in industry today.

G. *Reduction of Labor Turnover*

It is unnecessary to review either the extent or the evil effects of undue labor turnover. Much has been written on the subject, recent experience has made us familiar with its prevalence, and but brief discussion is necessary here.

Much of the restlessness in industry is curable. It is due to the existence of unsatisfactory conditions in just those features of management discussed in the preceding topics — to low wages, to long hours, to poor working conditions, to lack of proper selection, fitting, and

training, and to a conviction on the part of the employee that for him his present job in his present place offers no future. Naturally, therefore, with the removal of the causes in any particular place the evil itself largely disappears. This has been the experience in numberless plants which have adopted advanced measures more or less completely, and the testimony to this effect is in nowise limited to the particular group of industries we are here considering. The simple fact that their adoption with the accompanying low labor turnover are characteristic of scientific management plants to a high degree, as is proved by their records, is what primarily concerns us at present. Altho the amount of turnover has increased probably without exception during the last three years, it has noticeably been kept within bounds, comparatively, in plants of this type. Upon the introduction of labor-saving devices and methods where increase in sales has been insufficient to enable the retention of the whole previous force, the policy has been adopted of securing an eventual net reduction in personnel, through filling the places of those who voluntarily leave, from the ranks of the resultant force trained, as before mentioned, to perform several different operations.

H. *A Spirit of Coöperation and Confidence, and a Feeling of Security*

As a result of all of the positive products of advanced management enumerated above come the last and most important of them all. Indeed so important is the spirit of coöperation and confidence and the feeling of security on the part of the whole personnel that nothing should be allowed to undermine them; for without them, altho a certain *efficiency* may be obtained, true *scientific management* is impossible.

Coöperation may be obtained only by securing the confidence of those with whom we deal, and this confidence in turn results only when each man feels secure in the belief that he is in the best possible place for him and that he need have no fear for the future as long as he fully plays his own part.

Needless to say a feeling of security is not engendered by rate cutting, by low wages, by long hours and poor working conditions; it does not spring from paternalism nor from leaving in the hands of the foreman — the most directly interested party — the arbitrary power of promotion, reprimand, demotion or discharge with the often resulting nepotism and favoritism, not to say despotism. A sense of security is not furthered through a feeling on the part of the operative that not only is his training, development and guidance neglected by the management, but that even tho he may try hard himself, there is yet little chance for him to secure just recognition. An overemphasis of the profit motive does not lead him to feel that he will not some day be forced to choose between the employer and his own self-respect or his own best interests. Security does not accompany such conditions.

Confidence and an open mind is not established through haphazard methods of manufacture (for which the capable workman at heart has a profound if respectful disgust); low wages and high costs, which he knows are unnecessary, do not impel respect for the management, when he knows they are caused by the nonuse or the misuse of equipment, of labor and of materials which he sees about him and which he knows it is the management's responsibility to remedy. Industrial strife does not inspire in the workman confidence in a management which, as he knows, usually brings it on through shortsighted or selfish dealings. No great

respect for the ability for his leaders is awakened when he realizes that they know less about what constitutes a proper day's work and how to bring it to pass than he does — when, in other words, the leader knows less in this respect than the led. Only when the management really assumes its full share of the work and the responsibility may his confidence be secured.

And only through making this security and this confidence an actual fact has scientific management been able to produce what it so highly prizes and what it has so remarkably obtained — true coöperation.

We may thus distinguish several marked characteristics and accomplishments of Scientific Management. The first is its stability — the fact that it has progressed through the stages of novelty and exploitation to that of permanence. The second is its marked contributions to purely economic factors such as increased production and decreased cost, improvement in quality, a more rapid capital turnover, and the stimulus to industry in general resulting from the sound foundation of knowledge on which it is based. The third is its equally striking but far more important contributions to the field of human industrial relations in the success with which it has maintained industrial peace, increased wages, improved working conditions, established proper employment and training facilities, stimulated and provided for a larger individual opportunity, reduced labor turnover and secured true coöperation between management and men.

Such are some of the notable constructive accomplishments of the science of management in the field of industry during the thirty years or less of its development.

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INDEBTEDNESS OF PRINCIPAL BELLIGERENTS [1]

SUMMARY

Total debts of principal belligerents, 504. — Table showing debts before the war and at its close, 505. — Expenditures, receipts from taxation, and borrowings of the United States, 507. — Great Britain, 508. — France, 510. — Italy, 514. — Russia, 516. — Germany, 519. — Austria-Hungary, 526. — Turkey, 527. — Loans to Turkey from Germany and Austria-Hungary, 529.

THE nine belligerent countries specified in the table below have accumulated, after more than four years of war, debts aggregating 236 billion dollars as compared with a total of 26 billion dollars before the beginning of the conflict. To the grand total, the allied countries contributed 170 billion dollars and the Central Powers, 66 billion dollars. Russia leads all the belligerents in the amount of indebtedness, and its obligations continue to increase daily. Inflation prevails here to a degree that is as astounding as it is deplorable. While in other erstwhile warring countries the issuing of paper money is more or less at a standstill, in Russia the government presses are kept busy night and day printing fresh credit notes. Germany follows next in order of importance, with Great Britain and France closely behind, as seen from the summary on the following page.

It must be remembered, however, that there is considerable duplication in the figures given above, the elimination of which would reduce the aggregate materially. In the amount of the national debt of Great

[1] Because of lack of information, Japan, Belgium and the Balkan belligerents are not discussed in this article.

SUMMARY OF PUBLIC DEBTS OF PRINCIPAL BELLIGERENTS[1]
(Million dollars)

A. *Allied Powers*

Country	Before entering the war		At most recent date		Amount of increase
	Date	Amount	Date	Amount	
Great Britain	Aug. 1, 1914	3,458	Feb. 8, 1919	36,457	32,999
United States	Mar. 31, 1917	1,208[2]	Jan. 31, 1919	23,267	22,059
France	July 31, 1914	6,598	Mar. 31, 1919	30,494	23,896
Italy	June 30, 1914	2,632	Oct. 31, 1918	12,177	9,545
Russia	Jan. 1, 1914	5,092	Jan. 1, 1919	67,362[3]	62,270
Total		18,988		169,757	150,769

B. *Central Powers*

	Date	Amount	Date	Amount	
Germany	Oct. 1, 1913	1,165	Jan. 1, 1919	38,531	37,366
Austria	Aug. 1, 1914	3,277	Oct. 31, 1918	17,072	13,795
Hungary	Aug. 1, 1914	1,989	Oct. 31, 1918	8,707	6,718
Turkey	Mar. 31, 1914	667	Dec. 31, 1918	1,823	1,156
Total		7,098		66,133	59,035
Grand total		26,086		235,890	209,804

Britain there are included loans to Allies and Dominions amounting to £1,683.5 millions on November 12, 1918, or approximately 8,193 million dollars. France had outstanding on March 7, 1918, 3,225 million francs or 622 million dollars, loaned to allied nations. The obligations of the Allies to the United States totaled 7,975 million dollars on January 31, 1919.[4] The extent of

[1] Unless otherwise indicated, the sources of the data presented in this table are identical with those furnished in the text proper. The rates of conversion into dollars are as follows: 1 lira or franc = 19.3 cents; 1 mark = 23.8 cents; 1 pound = $4.8665; 1 ruble = 51.5 cents; 1 Austrian crown = 20.3 cents; 1 Turkish pound = $4.40.

[2] Financial Statement of the United States, March 31, 1917.

[3] Inclusive of 50 billion rubles, conservatively estimated as the amount of paper money put into circulation by the Bolsheviki. *Cf.* L'Economiste Européen, October 18, 1918, p. 251. A recent statement by the Omsk government placed the circulation at the present time at 70 billion rubles. *Cf.* New York Times, April 19, 1919.

[4] The credits opened by the United States to its allies (i.e., the amounts not actually expended but upon which the latter can draw) totaled $9,036,269,000 on March 27, 1919.

financial assistance rendered to Bulgaria by Germany and Austria-Hungary is not known, altho it may be safely said that the great bulk of the former's expenditures has been met by loans from the latter two countries. Turkey's indebtedness is largely included in the estimate of its two principal allies for the loans of Austria-Hungary and Germany totaled £T 207 millions by the end of 1917, or 909 million dollars. Consequently great caution must be exercised in the use of figures appertaining to the net debt of belligerent nations.

Another note of warning must be sounded. The total cost of the war to these countries is by no means accurately reflected in the data presented in this table, even after due allowance is made for duplication as specified above. Even were it possible to translate the loss of lives into dollars and to evaluate all the damages and injuries caused by the war, our estimate would fall short of the truth. Increased and new taxation, the burden of which neutrals as well as belligerents had to bear during the war and will be forced to carry for decades to come, is one factor that may be lost sight of upon a superficial study of this table. The inflation resulting from the huge credit operations on government account and the increase in fiduciary circulation, has contributed in no small degree to the war's toll, and to the misery and suffering of the forces behind the firing lines.[1] Finally, one must reckon with the effects of the world war on the public indebtedness of neutral countries. The interruptions in the flow of commerce, seriously reducing the basis for taxation, increased expenditures accompanying mobilization, and observation

[1] In a subsequent article, the writer intends to treat briefly of the fiduciary element in public finance during the war. Some information as to the banking situation at the end of 1917 may be gleaned from an article on which the writer was engaged, appearing in the Federal Reserve Bulletin, April, 1918, pp. 267 et seq.

and maintenance of neutrality guarantees, and the rising costs of conducting the affairs of state have all forced neutral countries to resort to borrowing on a scale that is not usually appreciated.[1]

UNITED STATES

The total disbursements from March 1, 1917, to January 31, 1919, were $26,620,334,804, of which $7,975,267,248 represented loans to foreign governments. During the same period, the receipts, exclusive of the public debt, totaled $6,117,762,295.[2] To this total, receipts from customs duties contributed $357,574,899 and the internal revenue, $5,132,205,822. The ratio of revenue from taxation to total disbursements is therefore 23.0 for the entire period of the war to January 31, 1919, and the ratio of revenue from taxation to net disbursements, excluding loans to foreign governments, is 29.8.

The gross public debt had on January 31, 1919, reached a total of $23,267,039,032, distributed as follows: bonds, Liberty and others, $17,457,365,040; treasury certificates of indebtedness, $4,798,064,800; and war savings certificates, $1,011,609,242. The prewar debt had been reduced to $1,192,444,102 by December 31, 1918.[3]

The results of the four internal loans are indicative of the state of prosperity that existed in this country throughout the period of the war and point to the prodigious financial strength that had lain stored away, only to be mustered up as time and occasion demanded it. The first loan was for $1,989,447,389; the second

[1] A study of the effect of the war on the indebtedness of neutral countries was made by the writer and published in the Federal Reserve Bulletin, May, 1918.

[2] Taken from a statement prepared by Secretary Glass for the House Ways and Means Committee. New York Times, February 12, 1919.

[3] Financial Statement of U. S. Treasury, December 31, 1918.

for $3,807,864,349; the third for $3,793,780,647; and the fourth for $6,989,200,000.[1] In every case the loans were oversubscribed.

Great Britain

On August 1, 1914 the public debt stood at £710.5 millions; on February 8, 1919 it had reached £7491.4 millions, representing an increase of £6780.9 millions during the war.[2] In this amount there is, however, included advances to Allies and Dominions which totaled £1683.5 millions on November 12, 1918. The net debt on February 8, 1919 was, therefore, £5807.9 millions.

Details of the gross amount of debt are here given as follows:

(Million pounds)	Aug. 1, 1914	Feb. 8, 1919
Funded debt	586.7	317.7
Terminable annuities	29.6	21.9
Unfunded debt:		
3½ per cent war stock		62.7
4 per cent war stock		16.1
4 per cent and 5 per cent war stock		2012.1
National war bonds		1663.2
Treasury bills	15.5	1009.0
Exchequer bonds	20.5	392.6
War savings certificates		219.6
Other debt		1297.7
American loan		51.4
Temporary advances	1.0	377.2
Total	653.3	7442.2
Other capital liabilities	57.2	49.2
Grand total	710.5	7491.4

For the eight months ending March 31, 1915, the average daily expenditure was £2,050,864; in the fiscal year ending March 31, 1916, £4,271,666; in the fiscal

[1] Financial Statement of U. S. Treasury, December 31, 1918.

[2] London Economist, February 15, 1919, p. 206.

year 1917, £6,022,227; in the fiscal year 1918, £7,386,-908 and for the period, April 1, 1918 to December 31, 1918, £7,454,522. At times during 1917, the rise in expenditures was very marked and caused considerable concern when the liberal estimates of the Chancellor of the Exchequer were being continually outdistanced. From April 1, 1917 to May 5, 1917, the daily average was £7,971,000 and from May 6, 1917 to June 9, 1917, it was £7,532,000. A period of recession then set in until expenditures fell to £6,414,000 during the sixty-three days between June 9, 1917 and September 29, 1917. From September 30 to December 1, 1917 a rising tendency was again observable, the average being £6,774,000, and from the latter date to January 19, 1918, the daily expenditures rose to £7,517,000.[1]

For years prior to the outbreak of the war the Treasury showed a surplus of receipts over expenditures. This state of affairs was not maintained during the war but a serious attempt was made to defray a comparatively large proportion of expenses out of revenue. The rates of the income tax were raised in 1915 and again in 1916. Excise and customs duties were increased considerably and a munitions levy was imposed. Finally, in 1916 an excess profits duty was enacted, the fiscal effects of which were not materially felt until 1917.

The first year of the war saw a reduction in the ratio of net receipts from taxation to total expenditures, from 82.6 of the year preceding to 33.9. The following year witnessed a still further decline to 18.7, owing to the enormous increase in expenditures and slow adjustment of revenue. In 1917, the excess profits duty became an important factor in bringing about a rise of 4.8 in the ratio.

[1] Parliamentary Debates, June 25, July 24, December 12, 1917, and January 23, 1918.

The outstanding feature is that from August 1, 1914 to February 8, 1919, Great Britain has defrayed 23.0 per cent of her expenditures by taxation and 26.5 per cent by general revenue receipts (including posts, telegraphs, etc.). Were advances to Allies and Dominions deducted (which are classified as expenditures), it would be found that the ratio of tax receipts to disbursements is 28.1 and the ratio of general revenue to disbursements, 32.4. Details for the last seven years follow:

REVENUES AND EXPENDITURES OF GREAT BRITAIN[1]
(Thousand pounds)

Year ending March 31	Net receipts from taxation	Total revenue receipts of exchequer	Total expenditures	Ratio of net receipts from taxation to total expenditures	Ratio of total revenue receipts of exchequer to total expenditures
1913	154,854	188,802	188,622	82.1	100.1
1914	163,035	198,243	197,493	82.6	100.4
1915	190,054	226,694	560,474	33.9	40.4
1916	290,873	336,767	1,559,158	18.7	21.6
1917	516,276	573,428	2,198,113	23.5	26.1
1918	613,040[2]	707,235	2,696,221	22.7	26.2
April 1, 1918 to Feb. 8, 1919	573,118[2]	654,048	2,268,430	25.3	28.8
August 1, 1914 to Feb. 8, 1919	2,120,010[3]	2,443,236	9,220,282	23.0	26.5

FRANCE

In December, 1917, M. Klotz, Minister of Finance, stated that a deficit of 1,266,500,000 francs was impending in the ordinary budget for 1918, and to meet this exigency, he made five suggestions: (1) a supple-

[1] Compiled from Statesman's Yearbook, 1918; Sixtieth Report of His Majesty's Inland Revenue, 1917; and London Economist, February 15, 1919.

[2] Exchequer receipts from taxation.

[3] Includes eight-twelfths of the 1915 figure. Inasmuch as the fiscal changes during the first eight months of the war were comparatively unimportant, this method of computation was used.

mentary tax on excess profits, the rate to be 25 per cent if the profits remaining after payment of the original tax ranges from one to five million francs, and 50 per cent if the remainder exceeds five millions; (2) upward revision of the tax on inheritances and gifts; (3) new taxes on luxuries and expenditures; (4) revision of the tax on the shares of corporations; and (5) changes in administrative methods with a view of preventing fiscal frauds. These proposals were designed to yield 1,266,500,000 francs as additional revenue for 1918 and 1,774,000,000 francs annually thereafter.[1]

The recommendations of M. Klotz were not, however, followed out in full detail, altho the principle that the impending deficit should not be covered by credit operations was upheld. January 1, 1918 marked the introduction of the new measures as finally decided upon. First, the war profits tax was made applicable to sums of 100,000 francs or less, at the rate of 50 per cent. Progression was provided for when profits subject to the tax exceeded 100,000 francs, the maximum rate being 80 per cent. Second, a tax of 10 per cent *ad valorem* was levied on articles of luxury, and on expenditures in such establishments as hotels, restaurants, etc., which the departmental committee considered *de luxe*, effective April 1, 1918. Third, every payment of a sum exceeding 150 francs representing the retail sale price or the consumption of a commodity became subject to a tax of 20 centimes for every 100 francs or fraction thereof. Fourth, sundry changes were adopted relative to the tax on inheritances and gifts.[2]

The revenue receipts for 1916 were 5,018,343,700 francs; in 1917 they rose to 6,190,533,400 francs; and in

[1] M. Klotz, "Exposé des Motifs," Bulletin de Statistique et de Législation Comparée, December, 1917. The actual results for 1918 were, however, disappointing. The yield of the tax on payments was only 210 million francs as compared with the estimate of 781 millions. Cf. L'Economiste Européen, January 17, 1919, p. 40.

[2] Journal Officiel de la République Française, January 30, 1918.

1918, the total yield was 6,632,639,800 francs, inclusive of the new taxes above mentioned.[1] Revenue for normal years, as computed by the Minister of Finance, produced a total of only 4,159,122,759 francs; therefore, in 1917 the receipts were about one-half larger than those of an average year and about three-fifths larger in 1918.

Remarkable as this attempt may seem when it is recalled that during the last five months of 1914 the treasury receipts declined 38.6 per cent as compared with a normal year; in 1915, 19 per cent; and in 1916, 3.46 per cent,[2] the state of the French finances is by no means satisfactory. M. Ribot recently stated that the civil budget for 1919 involved an expenditure of 8.9 billion francs, exclusive of 1.1 billion francs for interest on the new loan (fourth), plus payments for damages, advances, etc., which will bring the total to about 17 billion francs.[3] With no new lucrative sources of revenue in sight and open dissatisfaction expressed with the luxury and income taxes, the situation is considered by some as being but short of alarming.

M. Klotz stated that in 1914, the average monthly expenditure was 1,318 million francs; in 1915, 1,900 million francs; in 1916, 2,743 million francs; and during the first nine months of 1917, 3,360 million francs—a total of 92,546 million francs for the whole period. During the same interval the total receipts were 13,816 million francs, or 14.9 per cent of the expenditures. In the revenue figures, however, there are included the income from monopolies and domains, and if the latter is ex-

[1] Taken from various numbers of the Journal Officiel de la République Française, and L'Economiste Européen, January 17, 1919, p. 40 (figures for 1918 incomplete).

[2] "Exposé des Motifs," op. cit.

[3] London Economist, December 28, 1918. Recently M. Klotz announced the total of the 1920 budget as 18.5 billion francs as compared with 5.3 billion francs for a normal year. Ibid., February 22, 1919, pp. 327, 328.

cluded, the ratio of taxes to expenditure is approximately 12 per cent for the first 38 months of the war.

In a more recent statement before the Chamber of Deputies, M. Klotz asserted that from August 1, 1914 to March 31, 1919, the expenditures for all purposes will have reached 192 billion francs, including 50 billion francs of exceptional expenses such as payments for war damages, pensions, etc.[1] The resources to that date were estimated at 158 billion francs, leaving a deficit of 34 billion francs. Of the resources only 18 billion francs represent the receipts from taxation. The ratio of receipts from taxation to total expenditures from the beginning of the war to March 31, 1919 is, therefore, only 9.4.

The results of the four internal loans are as follows:[2]

Year	Rate of interest	Price of issue	Nominal subscriptions (million francs)	Actual proceeds (million francs)
1915	5	87.25	15,205	13,308
1916	5	87.50	11,514	10,082
1917	4	68.60	14,803	10,171
1918	4	70.80	27,853	19,720
		Total	69,375	53,281

On July 1, 1914, the national debt of France was 34,188,147,969 francs, and the annual interest charges, 1,037,614,906 francs. On December 31, 1917, the former stood at 124,338,457,479 francs, and the latter at 5,216,617,058 francs. Of the total outstanding December 31, 1917, 20,441,545,000 francs were held outside of France and 44,822,153,800 francs, or approximately one-third of the total debt, had not been funded as yet.[3]

[1] London Economist, February 22, 1919, pp. 327–328.

[2] Ibid., December 7, 1918. A fifth loan, called "Loan of National Restoration," to be issued at 95 and bearing interest at 5 per cent was announced in the Journal Officiel, March 23, 1919. The amount of the loan has not been fixed as yet. Cf. also Le Monde Economique, December 7, 1918, p. 779.

[3] Bulletin de Statistique et de Législation Comparée, October, 1918, p. 602.

On August 31, 1918, the national debt of France was estimated (unofficially) at 130,127 million francs, consisting of the following: consolidated debt, 32,187; national defense treasury bills, 26,453; short-term bonds, 679; advances of the Bank of France and the Bank of Algiers, 19,415; credits of foreign countries, 25,678; pre-war debt, 25,715.[1] If to this sum there is added the fourth loan of 27,853 million francs, the debt at the end of 1918 may be placed at 157,710 million francs.[2]

ITALY

The official estimate of war expenditures from August 1, 1914 to October 31, 1918, is as follows: [3]

	Million lire
Aug. 1, 1914 to June 30, 1915	3,039.2
Fiscal year ending June 30, 1916	8,351.5
Fiscal year ending June 30, 1917	14,132.2
Fiscal year ending June 30, 1918	19,734.6
July 1, 1918 to Oct. 31, 1918	9,725.6
Total	51,983.1
Various deductions	984.6
Balance	50,988.5
Add payments to be made in foreign countries and interest paid upon war debts by Treasury	11,620.5
Total payments relating to war	62,619.0
Deduct military expenditures which would have been incurred, had peace prevailed	3,545.7
Net war expenditure	59,073.3

[1] L'Economiste Européen, October 4, 1918, pp. 212–213, Edmond Théry.

[2] M. Ribot estimated it at 170 billion francs. London Economist, December 28, 1918. The estimate in the text coincides roughly with the figures presented by M. Klotz as of March 31, 1919.

[3] Ibid., February 1, 1919, pp. 135–136.

The public debt stood at 63,093 million lire on October 31, 1918, composed of the following:[1]

Old debt		13,636
War debt:		
First loan, 4½ per cent, issued July, 1915, redeemable between 1925 and 1940	4,628	
Second loan, 5 per cent, issued Jan.–March, 1916, redeemable between 1925 and 1940		
Third loan, 5 per cent, issued Feb., 1917, not redeemable before 1931		
Fourth war loan, 5 per cent, issued Feb., 1918	3,986	
Fifth war loan	6,123	
Total internal loans	14,737	
Treasury bonds, 5 per cent (3 to 5 years)	3,052	
Exchequer bills, from 3 to 12 months	9,240	
Treasury bonds, discounted by British and American governments and credits opened by same	13,851	
Notes, issued by banks of issue for government account	6,536	
Notes, issued by government	2,041	
Total war debt		49,457
Grand total, Oct. 31, 1918		63,093

M. Nitti, Minister of Finance, recently stated that the actual deficit for the financial year 1917–18 was 6,271 million lire. Expenditures totaled 25,239 million lire of which 18,580 were for war purposes. Against this amount there were revenue receipts, 7,496 million lire, and proceeds from loans, 11,529 millions.[2] The budget for 1918–19 provided for receipts at 4,419 millions and ordinary expenditures at 4,207 millions,[3] as against

[1] Bankverein Suisse, February, 1917; Statesman's Yearbook, 1917; and London Economist, December 28, 1918.

[2] L'Economiste Européen, December 6, 1918, p. 363; Revue Financière et Economique d'Italie, October 31, 1918, p. 276.

[3] Bulletin de Statistique et de Législation Comparée, February, 1918, "Exposé Financier de M. Francesco Nitti, Ministre du Trésor, December 19, 1917," pp. 265–321.

4,855 millions and 5,515 millions, respectively, in the 1919–20 budget.[1]

A war profits tax, retroactive in character to the beginning of the war, was recently introduced.[2] New or accrued profits in excess of the ordinary amount subject to the income tax during the two years, 1913 and 1914, comprise the base of the war profits tax. All recipients are divided into two classes: Class A, persons engaged in industrial, commercial and mercantile pursuits, and Class B, middlemen (Fr. *intermédiaires*). For Class A, the rates vary from 12 per cent of the profits above 8 per cent to 10 per cent of the capital, to 35 per cent on profits exceeding 20 per cent of the capital employed, during the period August 31, 1914 to December 31, 1915. For the periods subsequent to December 31, 1915 the minimum rate is 20 per cent and the maximum 60 per cent. Those falling in Class B are taxed during the earlier period at the rate of 5 per cent on profits ranging from one-tenth to one-half of the basic figure, up to 35 per cent if the profits are triple the amount ordinarily accumulated. The minimum and maximum rates for periods subsequent to December 31, 1915, are 10 per cent and 40 per cent, respectively.

Russia

The discussion of the fiscal situation of Russia falls into two periods: (1) from the beginning of the war to October 14/27, 1917, when the Kerensky régime was overthrown; and (2) the period following the Bolshevist *coup d'état*.

From August 1, 1914 to the end of the year, the expenditures amounted to 2,546 million rubles; in 1915, they were 9,374.9 millions; 1916, 15,267 millions; and

[1] London Economist, December 21, 1918.

[2] Bulletin de Statistique et de Législation Comparée, May 1918, pp. 958, 959.

from January 1, 1917 to September 1, 1917, 14,204.8 millions; making a grand total of 42,392.7 million rubles. In October, 1917, the Minister of Finance stated that the total cost of the war would reach 51,470 million rubles by January 1, 1918.[1]

The growth of the national debt accompanying these tremendous outlays may be observed as follows:[2]

	Rubles
January 1, 1914	9,888,309,698
January 1, 1915	10,473,572,000
January 1, 1916	18,876,731,000
January 1, 1917	25,220,937,000
September 1, 1917	49,287,809,698

In the eight months of 1917 preceding the collapse of the Kerensky government, the public debt practically doubled, the total consisting of foreign loans, 8,461 million rubles; short-term obligations, 16,918.7 millions; internal loans, 11,408.2 millions; deficits incurred during the last three budget years, 2,611.6; and the pre-war debt of 9,888 millions.

Advances of the Bank of Russia to the Russian government played an important rôle in financing the war. On December 16/29, 1914, they totaled 1,016.9 million rubles; on December 16/29, 1915, 5,304.6 millions; on the same date of the following year, 8,591.2 millions and on October 16/29, 1917, they reached 18,362.2 million rubles.[3] During the same interval the notes in circulation rose from 2,864 million to 16,519 million rubles.

The internal war loans yielding 11,408.2 million rubles were made up as follows:[4]

[1] Viestnik Finansov, No. 39, October 14, 1917, pp. 369 et seq.

[2] Ibid.

[3] From the weekly statements of the Imperial Bank of Russia and the weekly reports contained in the London Economist.

[4] Taken from Statesman's Yearbook, 1917, Introduction (£ converted into rubles at 9.45685); also Le Rentier, October 17, 1917; and L'Economiste Européen, December 14, 1917, p. 380.

	Million rubles
State loan of 1914, 5 per cent, issued Oct., 1914, at 94	500
First loan of 1915, 5 per cent, issued Feb., 1915, at 94.	500
Second loan of 1915, 5½ per cent, issued April, 1915, at 99. .	1,000
Short-term loan of 1915, 5½ per cent, issued Oct., 1915, at 95	1,000
First loan of 1916, 5½ per cent, issued Feb., 1916, at 95. ...	2,000
Second loan of 1916, 5½ per cent, issued Oct., 1916, at 95...	3,000
Total, to end of 1916.....	8,000
Liberty loan of 1917, 5 per cent (computed)[1]	3,408
Grand total.....	11,408

The finances during the second period when the Bolsheviki assumed control can at best be inadequately described. Little reliable data are available, upon which conclusions may be based. The official Bolshevist organ, *Isvestia*, places the national debt on January 1/14, 1918, at 80,800 million rubles, composed as follows:[2] external loans, 15,800 million rubles; direct internal debt (of every description and character), 44,000; indirect interior debt, 4,800; "coupons" not presented and miscellaneous obligations, 15,200 millions.

A tax on capital, similar to the German "Kapitalsteuer" and designed to yield 10 billion rubles, was levied on the "bourgeoisie" during the latter part of 1918. In some provinces the yield was only one ten-thousandth of the estimate, and the results in general were so disappointing that it was considered "hardly worth entering in the budget as a separate item."[3] Likewise the tax in kind on richer peasants which was supposed to produce 7 billion rubles in foodstuffs has proved to be negligible in its results. The taxation authorities in the provinces of Orel, Kaluga and Tula reported that they were unable to collect the tax.[3]

[1] Represents the difference between the aggregate internal loans as stated by the Minister of Finance and the total of the preceding items.

[2] L'Economiste Européen, May 10, 1918, p. 299.

[3] London Economist, March 1, 1919, pp. 367, 368; Journal des Economistes, February 15, 1919, article by A. Raffalovich, "Finances bolcheviques en 1918," pp. 249–252.

Further light is shed on Bolshevist fiscal policies by the following summary representing budgetary estimates for 1918 and giving final results for 1917 (in thousand rubles):[1]

	Year 1917	First half 1918	Second half 1918
Expenditures:			
Ordinary	13,196,137	13,038,511	26,276,199
Extraordinary	14,675,131	4,564,216	2,797,995
Total	27,871,268	17,602,727	29,074,194
Revenues	.....	2,852,727	12,730,194
Deficit	.....	14,750,000	16,344,000

The fall in values consequent upon tremendously large issues of paper money reflects itself in the government budget of expenditures. This fact coupled with the new social policy on which the government is embarking, involving a prodigious outlay, explains the wide disparity between receipts and expenditures. Whereas the figures presented above by M. Krestinsky, Minister of Finance, are more or less true estimates as to the outgo, the income has been in all probability greatly overestimated. Witness the fact that the actual revenue for the first half of 1918 was only 539.6 million rubles, altho undue optimism produced an estimate of 2,852.7 million rubles, or nearly five times as much as was actually collected! Credit notes are issued to wipe out the deficit.

GERMANY

The financial policy of Germany stands in distinct contrast to that adopted by the allied countries. The outstanding feature of German war finance is the reliance placed on loans and advances to defray the

[1] London Economist, January 25, 1919, pp. 103, 104.

prodigious expenses incurred since the beginning of the war. The theory that a reasonable share of war expenditures should be met by increased taxation had found no strong adherents in the statesmen and financiers of Germany until recently, and consequently not only have expenses directly incidental to war not been covered by revenue at all but even debt charges and other items of the ordinary civil budget have been met from the proceeds of loans.

There are two reasons of weight that have in all probability operated to keep this policy strongly intrenched. First, the lack of elasticity in sources of revenue has been an almost insurmountable obstacle to the imperial government. According to an understanding reached by the Empire and the individual states, the former reserved for itself primarily the field of indirect taxation and permitted the individual states to exploit the remaining sources. With the outbreak of the war, imperial revenues declined because commerce with Germany was interrupted, and import duties and stamp taxes which constituted important items in the budget fell off considerably. Gradually this condition became more and more accentuated until it was decided to raise the rates of the tax on beer, tobacco, etc., to cover part of the ever-increasing deficit in the ordinary budget. This relief was, however, ephemeral in nature, since the expansion of military operations and the inflation process set in motion by heavy borrowings caused expenditures to soar to prodigious heights, beyond all reasonable calculation.

Meanwhile, the war also imposed additional burdens on the individual state governments and their war obligations became heavy. Existing sources of revenue were used to aid in meeting these expenses. Prussia, for example, increased the rates of the income tax, ranging

from 115 to 260 per cent of normal in respect to corporations and from 108 to 200 per cent of normal in respect to individuals, and the supplementary tax was increased by 50 per cent.[1] Bavaria and Württemberg advanced the rates of all direct taxes by 30 per cent; Saxony, from 10 to 30 per cent in the case of the income tax, and Baden, 25 per cent in some grades. Hesse increased the income tax rates by 27 per cent and the property tax rates by 82 per cent.[2]

Late in 1916, however, the imperial government found no alternative but to invade the territory heretofore reserved for the states, if it wished to maintain some semblance of meeting its interest charges out of current revenue. A direct tax was introduced, designed to reach the increment in the value of property of every description, in the years 1915 and 1916, and estimated to yield 1300 million marks. Tobacco duties and postal and telegraph rates were increased and new stamp duties were put into force. The total yield was estimated at 1950 million marks. Again, in 1917, some of the existing stamp taxes were advanced further and a coal tax of 20 per cent *ad valorem* (10 per cent for domestic consumers) was levied, effective until July 31, 1920. The property tax rates were also increased by 20 per cent and the total receipts from the new taxes were estimated at 1250 million marks, making a total of 2550 million marks of war taxation during the year.

In spite of the large income anticipated from the new taxes, a deficit of 86 million marks was foreseen in the

[1] Prussia which had no debt to speak of prior to the war, due to the large profits obtained from the operation of government-owned railroads, had accumulated a debt of approximately $1,450,000,000 by the end of March, 1919. The total war deficit to that date was $582,000,000. New York Times, April 8, 1919.

[2] F. W. Zimmerman, Bank Archiv, August, 1917. The "defence" levy imposed in 1913 was not collected until early in the war. It amounted to 966,845,100 marks or 14.89 marks per capita, to which Prussia alone contributed 593,719,400 marks or about 61 per cent. Cf. London Economist, July 27, 1918, p. 111.

SUBSCRIPTIONS TO GERMAN WAR LOANS[1, 2]

(Amounts in million marks)

Subscriptions	First Loan (Sept. 10–19, 1914)				Second Loan (Feb. 27–Mar. 15, 1915)				Third Loan (Sept. 4–22, 1915)				Fourth Loan Mar. 4–22, 1916)			
	No. of sub.	%	Amt.	%	No. of sub.	%	Amt.	%	No. of sub.	%	Amt.	%	No. of sub.	%	Amt.	%
1. Up to 200 marks	231,112	18.2	36	0.9	452,113	16.8	71	0.8	984,358	24.8	130	1.1	2,406,118	45.5	201	1.9
2. 300 to 500.	241,804	19.1	111	2.5	581,470	21.6	254	2.8	858,259	21.6	369	3.1	967,929	18.2	407	3.8
3. 600 to 1,000	543,143	42.9	587	13.1	660,776	24.5	604	6.7	918,595	23.2	844	7.0	885,941	16.7	794	7.4
4. 1,100 to 2,000					418,861	15.6	733	8.1	530,176	13.4	928	7.7	468,724	8.9	792	7.4
5. 2,100 to 5,000	157,501	12.4	579	13.0	361,459	13.4	1354	14.9	422,626	10.7	1563	12.9	347,725	6.6	1247	11.6
6. 5,100 to 10,000	56,438	4.5	450	10.1	130,903	4.9	1057	11.7	147,593	3.7	1202	9.9	113,927	2.2	907	8.5
7. 10,100 to 20,000	19,913	1.6	307	6.7	46,105	1.7	745	8.2	53,445	1.3	858	7.1	42,158	1.0	666	6.2
8. 20,100 to 50,000	11,584	0.9	410	9.2	26,407	1.0	926	10.2	32,840	0.8	1167	9.6	30,361	0.6	980	9.1
9. 50,100 to 100,000	3,629	0.3	315	7.2	7,742	0.3	648	7.2	10,000	0.3	850	7.0	9,100	0.2	734	6.9
10. 100,100 to 500,000 ...	2,050	0.1	509	11.4	4,361	0.2	1066	11.7	7,074	0.2	1766	14.6	6,308	0.1	1531	14.3
11. 500,100 to 1,000,000..	361	..	287	6.4	538	..	440	4.9	832	..	695	5.7	780	..	641	6.0
12. Over 1,000,000.....	210	..	869	19.5	325	..	1162	12.8	530	..	1729	14.3	574	..	1812	16.9
Total	1,267,235	100.0	4460	100.0	2,691,060	100.0	9060	100.0	3,966,418	100.0	12,101	100.0	5,279,645	100.0	10,712	100.0
Final results, including subscriptions from abroad and battle field	....	..	4480	..	....	..	9106	..	....	..	12,162	..	....	..	10,767	..
Details:	Issued at 97½ in two forms: (a) 5 per cent treasury bills falling due Oct. 1, 1920; and (b) 5 per cent bonds, not redeemable before Oct. 1, 1924.				Issued at 98½ in same two forms as the first loan.				Issued at 99 in the form of bonds, redeemable Oct. 1, 1924.				In two forms, viz.: (a) 4½ per cent treasury bills at 95 due July 1, 1932; and (b) 5 per cent loan at 98½, redeemable after Oct. 1, 1924.			

Subscriptions	Fifth Loan (Sept. 4–Oct. 5, 1916)				Sixth Loan [3] (Mar. 15–April 16, 1917)				Seventh Loan (Sept. 19–Oct. 18, 1917)			
	No. of sub.	%	Amt.	%	No. of sub.	%	Amt.	%	No. of sub.	%	Amt.	%
1. Up to 200 marks	1,794,084	47.1	154	1.4					3,233,472	61.9	208	1.6
2. 300 to 500	681,027	17.9	293	2.8	6,204,800	91.7	2226	17.15	693,729	13.2	295	2.4
3. 600 to 1,000	605,594	15.9	552	5.2					586,623	11.6	531	4.3
4. 1,100 to 2,000	301,863	7.9	520	4.9					264,871	5.1	461	3.7
5. 2,100 to 5,000	245,873	6.5	911	8.5	443,200	6.5	2158	16.62	233,542	4.5	868	7.0
6. 5,100 to 10,000	93,189	2.4	763	7.2					100,781	1.9	818	6.6
7. 10,100 to 20,000	40,571	1.1	651	6.1	92,000	1.4	2110	16.25	42,732	0.8	697	5.6
8. 20,100 to 50,000	28,500	0.7	982	9.2					33,914	0.6	1189	9.5
9. 50,100 to 100,000	9,748	0.3	810	7.6	19,500	0.3	1062	8.18	12,169	0.2	1024	8.2
10. 100,100 to 500,000	7,870	0.2	1710	16.1					9,145	0.2	2092	16.8
11. 500,100 to 1,000,000	1,032	..	853	8.0	11,200	0.1	5420	41.8	1,363	..	1130	9.1
12. Over 1,000,000	725	..	2448	23.0					1,032	..	3145	25.2
Total	3,809,976	100.0	10647	100.0	6,768,082	100.0	12979	100.0	5,213,373	100.0	12458	100.0
Final results including subscriptions from abroad and battle-field	....	..	10699	..	....	..	12979	..	....	..	12626	..
Details:	In two forms, viz.: (*a*) 4½ per cent treasury bills at 95, due between 1923 and 1932; and (*b*) 5 per cent loan at 98, not redeemable before Oct. 1, 1924.				In two forms, both at 98: (*a*) 4½ per cent bond, redeemable in drawings at 110 to 120; and (*b*) 5 per cent bonds, not redeemable before Oct. 1, 1924.				Details same as sixth loan.			

[1] Sources: Reports of the Reichsbank, 1915 and 1916; Berliner Tageblatt, December 23, 1917; Frankfurter Zeitung, September 6, 1917; and London Economist, May 19, 1917.

[2] Full details not available in this country, as far as can be ascertained. Approximate figures as herein given are taken from Revue d'Economie Politique, Janvier-Février, 1918, article by Charles Rist, p. 39. The total is the one officially announced.

[3] In addition to the seven war loans shown in this table, two further loans were issued, the full details of which have not been made public. The subscriptions to the 8th loan amounted to 14,500,000,000 m. (according to L'Economiste Européen, April, 26, 1918, p. 270) and the 9th loan, 10,433,959,700 m. (London Economist, December 14, 1918). The number of subscribers to the last loan was 2,717,657, of whom 2,297,143 subscribed for 1000 marks or less (ibid.). Savings banks contributed 3,302 million marks and other banks and bankers, 5,349 millions (L'Economiste Européen, December 13, 1918).

civil budget for the fiscal year 1918. The sphere of taxation, altho expanded on these occasions, was necessarily too restricted for the needs of the imperial government.[1]

The second reason for the delay in setting up a sound policy of war financing was that from the beginning of the conflict up to the time that a change in the fortunes of war took place, German statesmen entertained the hope of speedily gaining a decisive victory over their adversaries, crushing one or more of them completely and exacting heavy indemnities. German militarists considered it highly probable that they could force their vanquished enemies to bear the burdens of war and consequently hesitancy was displayed on the part of the imperial government in revising its financial policies. This illusion was gradually dispelled by the turn of events and facing the alternative of incurring heavier and heavier deficits, the only expedient of increasing the revenue from taxation was followed. The tide was not, however, stemmed to any large degree.

The results of the first seven war loans are here given. While the boast of German officialdom that war loans had become increasingly popular may be justified by a glance at the number of subscribers in each class, a study of the amounts subscribed seems clearly to indicate that the contrary is true. The ratio which subscriptions of a million marks or more bore to the total was 19.5 in the case of the first loan, dropping to 12.8 in the second and rising thereafter until in the seventh loan it amounted to 25.2. In every case, the number of these

[1] For the fiscal year 1919, the rates of the imperial income tax as proposed vary from 5 per cent on the first 10,000 marks to 50 per cent on the excess above 200,000 marks and the rates of the war tax on property, from 1 per cent on the first 200,000 marks to 5 per cent on a million marks and above. L'Economiste Européen, July 12, 1918, p. 29.

subscriptions was practically negligible. Subscriptions of 100,000–500,000 marks rose from 37.3 per cent in the first loan to 51.1 per cent in the seventh loan, while at the same time the amount of subscriptions of 2000 marks or less, comprising 91.8 per cent of the total number of subscribers in the last loan, fell from 16.5 per cent in the first to 12.0 per cent in the seventh war loan. The first seven classes all show declines, altho the decreases are neither alike nor continuous in every instance. The greatest per cent of increase in the amounts subscribed is exhibited by the last class, embracing subscriptions of a million marks or more, and following closely are subscriptions between 100,000 and 500,000 marks. All these facts point to the conclusion, therefore, that greater and greater reliance was being placed upon banking credit and that popular subscriptions, altho increasing in number, were contributing progressively less and less to the total.

The sum of 139 billion marks was voted by the Reichstag up to July, 1918. In October, 1918, the government stood in need of more funds and requested 15 billion more. This amount was refused and the government resorted to note issues as a result.

According to a speech recently made by Dr. Schiffer,[1] erstwhile Minister of Finance, the daily expenditure during the war rose from 49 millions in 1914 to 135 millions in 1918. The yearly expenditures were as follows (in billions of marks): 1914, 7.5; 1915, 23; 1916, 26.6; 1917, 39.5; 1918, 48.5. In addition credits were opened by Germany to her allies to the extent of 9.5 billions, and treasury bonds were issued to the extent of 6 billions, making a total war expenditure of 160.6 billion marks. If to this amount, there is added the pre-war

[1] New York Times, February 18, 1919.

debt, as of October 1, 1913, 4,897 million marks,[1] the present indebtedness of the German Empire may be put roughly at 165 billion marks.[2]

AUSTRIA-HUNGARY[3]

The expenditures of Austria alone for civil and war purposes were 10,706 million crowns in the fiscal year ending June 30, 1915; 15,726 millions in 1916; 18,788 millions in 1917; and 22,170 millions and 24,321 millions, as estimated in the 1918 and 1919 budgets, respectively.[4] The declaration of the armistice and consequent demobilization will in all probability greatly reduce the latter figure.

The Budgetary Committee of the Reichsrat estimated for the year 1917 the ordinary revenue to produce 3,890 million crowns and extraordinary taxation 304 millions, a total of 4,194 millions or 18.9 per cent of the expenditures.[5] In the 1919 estimates the revenue is placed at 4,885 million crowns or 20.1 per cent of the disbursements. These deficits are covered partly by advances from the Austro-Hungarian Bank and partly by inter-

[1] Statistisches Jahrbuch für das deutsche Reich, 1915, p. 339. This figure may be taken as indicating the maximum state of the debt during the period, October 1, 1913, and the beginning of the war, since the tendency had been to reduce the amount outstanding during the few years prior to October 1, 1913.

[2] This estimate coincides roughly with that of Sir Edward Holden, London Economist, February 1, 1919, pp. 142 et seq. Under date of March 27, 1919, the New York Times published a statement made by Dr. Schiffer at Weimar to the effect that total war expenditures to the end of 1918 were 186 billion marks, and revenues 17 billion marks or 9.1 per cent of the former. The war debt was placed at 157 billion marks and the interest on the debt, at 7.9 billion marks. Annual expenditures for the future were estimated at 14 billion marks as against 2.4 billion marks before the war.

[3] German Austria has recently adopted a budget for the period November 1, 1918 to June 30, 1919. A loan of 500 million crowns was issued, consisting of 4 per cent treasury bonds payable within two and one-half years. The issue price was 97 if payment was made in specie, and 99, if one-fourth of the amount subscribed for was paid in Austrian war bonds and the remainder in specie. Cf. L'Economiste Européen, December 13, 1918, p. 383.

[4] L'Economiste Français, January 12, 1918, p. 36.

[5] Neue Freie Presse, September 26, 1917.

nal loans. Practically every source of revenue has been tapped to the maximum limit.

Expenditures for purely military purposes totaled 38,636 million crowns for the first four years of the war, of which 6,327 millions were made in 1915; 9,513 in 1916; 11,453 in 1917; and 11,343 millions in 1918.[1]

The war debt of Austria on May 24, 1918 was 57,052 million crowns, as given by the Reporter on the National Debt to the Austrian Budget Commission.[2] Of this amount 16,209 represented advances of the Austro-Hungarian Bank; 29,275, proceeds of internal loans (less conversions); 16,209, advances of Austrian banks; and 3,234, advances of German banks. On October 31, 1918, the total public debt of Austria was 84,097 million crowns, according to the Annual Report of the Austro-Hungarian Bank, of which 67,955 represented the amount resulting from the war.[3]

The total debt of Hungary stood at 42,891 million crowns on October 31, 1918, of which 33,091 millions were incurred during the war.[4] Approximately 16 billion crowns represent the net proceeds from loans, about 10 billions are due the Austro-Hungarian Bank and the remainder of the war debt consists of advances by private banks.[5]

Turkey

In normal years the national revenues varied from 25 to 30 million Turkish pounds but in 1916, owing to the continual decrease in import and export duties through the interruption of commerce receipts fell to 21 millions. The budget for 1918–19, estimated revenue at

[1] L'Economiste Européen, August 2, 1918, p. 77.

[2] Ibid., June 7, 1918, p. 366 and London Economist, June 29, 1918, p. 1032.

[3] L'Economiste Européen, January 31, 1919, p. 78.

[4] Ibid.

[5] London Economist, December 28, 1918, p. 882.

WAR LOANS OF AUSTRIA-HUNGARY[1]

(Amounts in million crowns)

	Austria		Hungary	
First Loan	2,201	Issued Nov., 1914 at 97½, 5½ per cent, matures April 1, 1920 at par.	1,175	6 per cent loan issued Nov., 1914 at 97½, not redeemable before Nov. 1, 1920.
Second Loan	2,688	Issued May, 1915 at 95½, 5½ per cent, not redeemable before 1925.	1,132	6 per cent stock, issued May, 1915 at 97.5, not redeemable before 1921. 5½ per cent stock at 90.8, not redeemable before 1925.
Third Loan	4,203	Issued Oct., 1915 at 93.6, 5½ per cent treasury bills, not redeemable before Oct. 1, 1930.	1,985	Issued Oct.-Nov., 1915 at 97.1. 6 per cent Rente not redeemable before 1921.
Fourth Loan	4,520	Issued May, 1916 in two forms: (*a*) 5½ per cent treasury bills repayable at par, June, 1923 at 93. (*b*) 5½ per cent bonds to run for 40 years, at 95.5.	2,025	Issued April-May, 1916. 6 per cent Rente at 96.7, not redeemable before Nov. 1, 1921. 5½ per cent treasury bills at 91.4, not redeemable before June 1, 1926.
Fifth Loan	4,467	Issued Nov., 1916-Jan., 1917, in same form as preceding loan. Issue price 92½ and 96½, respectively.	2,415	Issued Nov.-Dec., 1916. 6 per cent Rente at 97.2, not redeemable before 1920. 5½ per cent treasury bills at 95.5, redeemable at 105 between 1922 and 1942.
Sixth Loan	5,189[2]	Issued May-June, 1917, in same form as preceding loan. Issue price 92½ and 94, respectively.	2,500[3]	6 per cent Rente and 5½ per cent treasury bills.
Seventh Loan	6,044[2]	Issued Dec., 1917, in two forms: (*a*) 5½ per cent loans at 91, redeemable at par by drawings between 1923 and 1957. (*b*) 5½ per cent bonds at 93, redeemable at par, 1926.	3,690[3]	Issued Dec., 1917. 6 per cent Rente at 96.1. 5½ per cent treasury bills at 91½, convertible at option of government after Aug. 1, 1922.
Eighth Loan	5,763[2]	(*a*) 5½ per cent treasury bonds at 95½ due Sept. 1, 1924.[4] (*b*) 5½ per cent Rente amortizable in 40 years at 94.[4]	3,860[3]	Issued June, 1918. 5½ per cent Rente at 91 and 92, according to cash payment or installment. No date set as to redemption.
Total.....	35,075		18,782	

[1] General sources: Statesman's Yearbook, 1917; Fremden-Blatt, December 16, 1917; Frankfurter Zeitung, October 24, 1917; Kölnische Zeitung, November 6, 1917; Neue Freie Presse, October 28, 1917; Bankverein Suisse, Bulletin No. 2, February, 1917.

[2] Frankfurter Zeitung, as quoted in London Economist, August 3, 1918, p. 146.

[3] London Economist, September 14, 1918, p. 335.

[4] L'Economiste Européen, May 10, 1918, p. 299.

£T 37,016,698 and expenditure at £T 51,402,327, thus leaving a deficit of £T 14,385,629 to be met by credit operations.[1] The budgetary deficits for the fiscal years 1917 and 1918 were £T 39,077,556 and £T 27,430,396, respectively.[2] Actual war expenditures have averaged about five million Turkish pounds monthly, the total being £T 180,000,000 by the end of 1917.

The subscriptions to the first Turkish internal loan disclosed a total of £T 17,977,600, of which £T 7,396,260 were raised in Constantinople and the remainder, in the provinces. This was the first and only attempt on the part of the Ottoman government to defray military expenses out of funds derived from native sources.[3]

The Ottoman debt may be estimated at £T 414,334,000, consisting of the following items:[4]

Loans from Germany, to Aug. 31, 1917.....	£T 142,000,000
Loans from Austria-Hungary.....	8,200,000
Requisitions and deferred payments.....	38,000,000
Borrowed from Germany in October, 1917..	56,500,000
First internal loan.....	17,978,000
Total war debt.....	£T 262,678,000
Pre-war debt.....	151,656,000
Total public debt.....	£T 414,334,000

The details of the first six issues of Turkish notes in Germany may be gleaned from articles in the *Frankfurter Zeitung*.[5] The first issue of £T 5,661,000 payable six months after peace is declared, is secured against a deposit of £T 3,552,000 in gold held in Germany and

[1] London Economist, February 23, 1918.

[2] Statesman's Yearbook, 1917, p. 1352.

[3] London Economist, September 7, 1918, p. 300.

[4] Nieuwe Rotterdamsche Courant, December 5, 1917 and Statesman's Yearbook, 1917. This estimate excludes a loan rumored to have been made shortly before the capitulation of Germany and reported as varying from 32 to 45 million Turkish pounds. London Economist, September 7, 1918, p. 300. On the bulk of these loans, floated outside of Turkey proper, there are no interest charges to be met.

[5] October 12 and 15, 1917, in particular.

£T 2,109,000 held in Austria. The second issue of £T 7,802,000 and the third issue of £T 11,700,000 are both payable one year after peace, being covered by German exchequer bonds. The fourth loan of £T 27,777,940, repayable in gold from three to seven years after the declaration of peace, was issued against German exchequer bonds and is payable from eight to eleven years after peace. The German government at the same time guaranteed that the Turkish pound would never be allowed to fall below 18.45 marks.

Although the law of April 8, 1916, placed the currency on a gold basis, Turkey is now almost completely on a paper basis. The currency is greatly depreciated. Information from German sources had, early in 1917, placed the discount on paper money between 50 and 75 per cent in Constantinople and between 75 and 80 per cent in Bagdad and Syria.[1] It is also reported that the Cabinet has recently decided on the decimal system of coinage and metric system of weights and measures.[2]

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[1] Article by Dr. C. A. Schaefer in Archiv für Wirtschaftsforschung in Orient, April, 1917.

[2] London Economist, September 7, 1918, p. 300.

THE IRON-ORE PROBLEM OF LORRAINE

SUMMARY

Importance of iron-ore reserves of Lorraine, 531. — Comparison with reserves of other countries, 534. — Quality and location of French reserves, 535. — Dependence of German steel industry upon Lorraine, 536. — Also of French steel industry, 538. — Probable French policy of control, 540. — Coal production of France and Germany, 544. — Importance of the Saar district, 547. — German pre-war view of importance of controlling iron in the interest of militancy, 552.

THE victory of the Allies in the late world war puts an end — for the present at least — to the pan-German ironmaster's dream of an industrial hegemony based upon national self-sufficiency with regard to the control of the sources of raw materials. This dream was apparently a cause of the war just closed. In the acquisition of Alsace-Lorraine in 1870–71 Germany recognized the possibilities for her iron and steel manufactures involved in the possession of extensive iron-ore fields. The rapid growth of the German iron and steel industry during the two decades immediately preceding the war was based in part upon the control of the iron ores of Lorraine. Had Germany won the war there is little doubt that this control would have been extended over the rich ore fields of northeastern France. The defeat of Germany, however, will not only frustrate her ambition to increase her possessions of valuable ore properties but deprive her of what she had gained in the Franco-German War of 1870–71.

The restitution of Alsace-Lorraine will return to France the possession of over two billion tons of iron

ore, and with the supplies in the adjoining territory of French Lorraine, will give to that country the finest iron-ore basin in Europe, and one of the finest in the world. The magnitude of the iron-ore reserves of Lorraine — both German and French — may be indicated by a brief description of the region in which these deposits are located and a comparison with the total reserves of Europe and with the leading iron-ore fields in other parts of the world.

The Lorraine area forms a part of a great basin of ores (minette) embracing a part of northern France, southwestern Germany, Luxemburg and southern Belgium. The mining region of French Lorraine comprises about 150,000 acres with a possible addition of 30,000 acres.[1] This field is divided into certain folds or basins, of which the basin of Briey is the most important and contains about two-thirds of the estimated supplies of French Lorraine.[2] German Lorraine is somewhat more compact covering an area of about 108,000 acres.[3] This area has supplied the iron and steel industry of western Germany with the greater part of its ore.

In 1910 the actual or proved reserves of iron ore with their equivalent metallic iron content were estimated for the Lorraine region as shown by the table on page 533.[4]

Out of this enormous total of actual or proved ore reserves France, with the possession of what has been German Lorraine, will have in this field deposits amounting to 5,330,000,000 tons, capable of yielding

[1] The Iron and Coal Trades Review (London), December 6, 1918, p. 633.

[2] Bulletin of the American Institute of Mining Engineers, September, 1918, pp. 1492-96.

[3] The Mineral Industry for 1917, p. 357. The Mineral Industry is published yearly by the McGraw-Hill Book Company of New York.

[4] Iron Ore Resources of the World, vol. i, pp. xxvi, xxvii, xliii and xlv. The best survey which has yet been made of the iron-ore resources of the world was that undertaken at the initiative of the Executive Committee of the Eleventh International Geological Congress held in 1910 at Stockholm, Sweden. The results of the survey were published in two large volumes with the above title.

(000's omitted)

Territories	Actual ore supplies [1]	Equivalent metallic iron content	Potential ore supplies [1]
	(metric tons)	(metric tons)	
French Lorraine	3,000,000	1,000,000	
German Lorraine	2,330,000	755,000	Very considerable
Luxemburg	270,000	90,000	
Belgium	62,000	25,000	
Total	5,662,000	1,870,000	

1,755,000,000 tons of iron. The iron-ore reserves of German Lorraine constituted nearly two-thirds of the proved deposits of the German Empire, and those of French Lorraine, over 90 per cent of the estimated total of France. The results of the redistribution of these supplies upon the reserves of the two countries named may be indicated as follows:[2]

(000's omitted)

Time	France		Germany	
	Actual ore supplies	Equivalent metallic iron content	Actual ore supplies	Equivalent metallic iron content
	(metric tons)	(metric tons)	(metric tons)	(metric tons)
Before the war	3,300,000	1,140,000	3,607,700	1,270,000
After the war	5,630,000	1,895,000	1,277,000	515,000

The proved iron-ore reserves of all Europe were computed in 1910 at 12,031,900,000 metric tons with an equivalent metallic iron content of 4,732,800,000 metric tons. The supplies of France, therefore, as a consequence of the war, now constitute over 45 per cent of

[1] The term actual is used to signify proved and commercially valuable ore. Potential is the word used to designate ore supplies which under present conditions cannot be profitably exploited, because of low iron content, unfavorable location with respect to means of transportation, or deleterious ingredients. The dividing line is by no means clearly drawn.

[2] Iron Ore Reserves of the World, vol. i, pp. lxxiii–lxxv.

the estimated actual iron-ore reserves of Europe, and over 40 per cent of their iron content.

All but 300,000,000 tons (a little over 5 per cent of the total) of the French deposits are in a tolerably compact area, and not very far from coal.[1] In these respects the ore resources of France differ from those of other important ore-producing countries of Europe. The remaining reserves of Germany while still great are diffused over a considerable territory. The large supplies of Great Britain[2] are also rather scattered, and those of Russia are distributed over a very wide area. The well-known deposits of Spain and the magnificent reserves of northern Sweden are located in countries or regions with very limited supplies of coal.

The Lorraine region is one of the six leading iron-ore districts of the world. These districts with their reserves, as estimated in 1910, are tabulated below:[3]

LEADING IRON-ORE DISTRICTS OF THE WORLD
(000's omitted)

Territories	Actual ore supplies	Equivalent metallic iron content	Potential ore supplies	Equivalent iron content
	(metric tons)	(metric tons)	(metric tons)	(metric tons)
Lake Superior, U. S...	3,500,000	2,000,000	72,000,000	36,000,000
Lorraine:				
France, Germany, Luxemburg, Belgium	5,662,000	1,870,000	Very considerable	
Northern Sweden.....	1,035,000	670,000	178,000	105,000
Oriente, Cuba.....	1,903,000	856,800	1,007,000	454,000
Bell I., Newfoundland	3,635,000	1,961,000	...[4]	
Minas Geraes, Brazil..	....	....	5,710,000	3,055,000

[1] This coal, however, is mainly within German territory.

[2] Iron Ore Reserves of the World, vol. i, pp. lxxiii–lxxv. The actual reserves of Great Britain were computed at 1,300,000,000 tons with an iron content of 455,000,000 tons. The potential reserves were estimated at a very much higher figure — over 37 billion tons, exceeding that of any other country in Europe.

[3] Iron Ore Reserves of the World, vol. i, pp. xxvi–lxxix. See also Bulletin of American Institute of Mining Engineers, September, 1918, pp. 1472–1479.

[4] The potential supplies of western Newfoundland are given as "enormous." These ores, however, contain much titanium which under present metallurgical processes materially reduces the value of the ore.

Since 1910 some of these estimates in the more recently surveyed fields have changed. The proved reserves of the Province of Oriente, Cuba, are now estimated at 3,000,000,000 tons, and those of Minas Geraes, Brazil, at approximately 3,500,000,000 tons.[1] The resources of northern Sweden are also rated somewhat more highly than the above figures indicate, and the potential ore supplies of the Lake Superior district are materially reduced under later estimates.

The importance of the Lorraine field is not alone indicated by the richness of its ore deposits. None of the other great reserves above tabulated, including even the Lake Superior region of this country, are so favorably situated with respect to the sources of coal and limestone — barring the question of political boundary lines — and so near some of the leading markets for iron and steel goods. The deposits of northern Sweden, Cuba and Brazil are located in regions with a very inadequate coal supply. Even in the case of the Lake Superior deposits which are near enough to the Great Lakes to afford the advantages of cheap water transportation, the cost of ore at blast furnaces at lower lake ports and in the Pittsburgh district is practically doubled by the expense of shipment.[2] It is true that in iron content per unit of output the ores of Lorraine are inferior to those of Sweden, Brazil, Newfoundland, and Lake Superior.[3]

[1] E. C. Harder of U. S. Geological Survey, in Bulletin of American Institute of Mining Engineers, September, 1918, p. 1472. Also page 1479.

[2] The Commissioner of Corporations in his Report on the Steel Industry estimated the book cost of ore at lower Lake ports, including general expenses, taxes and depreciation at $2.64 per gross ton. Of this total the rail freight amounted to $0.67, and the Lake freight, including marine insurance, to $0.74. See Report, Part III, p. 34. Out of a total cost of $2.64, $1.41 constituted transportation charges. Before the outbreak of war in Europe the price of standard non-Bessemer Mesabi ore (51.50 per cent iron content) at lower Lake ports was quoted at an average price for the years 1911–14 at $3.15 per gross ton. About half of that price represented transportation charges.

[3] The iron content of Lorraine ores averages about 35 per cent. The ores of Sweden and Brazil range from 65 to 70 per cent and those of Newfoundland and Lake Superior from 50 to 60 per cent.

It may also be pointed out that owing to the relatively large proportion of phosphorous in these ores they are not suited for the manufacture of certain grades of steel.[1] These disadvantages, however, are more than offset for ordinary iron and steel manufacture by their geographical location.

The importance of the Lorraine deposits is further emphasized by the fact that in the years immediately preceding the outbreak of hostilities they were supplying the bulk of the iron ore of the two leading ore-producing countries of Europe,[2] and were furnishing the raw material upon which their iron and steel industries were built. In 1913 the iron-ore production of Germany (excluding Luxemburg) amounted to 26,771,598 tons.[3] This production was greater than that of any other country in the world except the United States. Of the German output 21,135,554 tons were mined in Lorraine.[4] If the production of Luxemburg amounting to 7,332,000 tons were added to that of German Lorraine we should have an iron-ore output for the Luxemburg-Lorraine district of nearly 28,500,000 tons, and for the territory embraced within the German Customs Union of over 34,000,000 tons.[5] France produced in 1913, 21,572,835 tons of iron ore, of which over 90 per cent was produced

[1] For the making of Bessemer steel, i.e., acid Bessemer, the Lorraine ores are unsuited. For some kinds of manufacture Bessemer steel is superior to basic steel and for some kinds of ordnance material low-phosphorus steel is necessary. Bessemer ore must not contain more than one part phosphorus to 1,000 parts metallic iron. In the case of low-phosphorus ore the proportion of phosphorus allowable is less than half that of Bessemer. The best ore field now known for Bessemer and low-phosphorus ores is that of Brazil.

[2] The production of iron ore in the United Kingdom which ranked third among the countries of Europe was 15,997,328 tons. While the United Kingdom produced less ore than France she surpassed that country in the manufacture of pig iron and steel.

[3] Mineral Resources of the United States, 1915, p. 318. Work published by the U. S. Geological Survey.

[4] The Mineral Industry for 1917, p. 357.

[5] The Iron Trade Review, January 2, 1919, p. 30, and Mineral Resources, 1915, p. 318. The Iron and Coal Trades Review (London) gives the production of Luxemburg for 1913 as 7,332,000 tons. See number of November 5, 1918, p. 517.

in the mining districts of Briey, Nancy, and Longwy — in what is called French Lorraine. Altogether, therefore, the Lorraine field was supplying Europe just before the war with an annual ore tonnage of between 45 and 50 millions.

This immense production formed the basis of the flourishing iron and steel industry of Germany and was the foundation of the iron and steel manufactures which had grown up in France. Without the exploitation of the Lorraine deposits the astonishing development of the iron and steel industry of Germany would be unthinkable, and the acquisition of a large part of these deposits by Germany in 1871 was doubtless a factor in hastening this development. The importance of the Lorraine deposits in relation to this industrial growth is not indicated alone by the iron and steel manufactures of Alsace-Lorraine, but by the fact that the entire industry in the Rhenish-Westphalia and the Saar districts, depended upon Lorraine.[1] These districts are within easy reach of the region discussed, and with Lorraine-Luxemburg produced the bulk of the iron and steel of Germany. The pig iron production of Germany in 1913 amounted to 19,291,920 tons, and was distributed among the different provinces in the following proportions:[2]

PROPORTION OF THE TOTAL PIG-IRON PRODUCTION OF GERMANY (INCLUDING LUXEMBURG) BY DIFFERENT PROVINCES, 1913

District	Percentage
Rheinland-Westphalia	42.5
Siegerland, Lahn, and Hesse-Nassau	5.1
Silesia	5.2
Central and East Germany	5.2
Bavaria, Württemburg, and Thuringia	1.6
Saar	7.1
Lorraine and Luxemburg	33.3

[1] Iron Trade Review, January 2, 1919, p. 30.

[2] The Iron and Coal Trades Review (London), January 16, 1914, p. 97. Figures are taken from the Statistical Bureau of the Verein Deutscher Eisen- und Stahl-Industrieller.

It will be observed that the Rhenish-Westphalia and Saar districts and Lorraine and Luxemburg produced in 1913 over 80 per cent of the pig-iron output of the territory embraced within the German Customs Union. Historically and geographically the iron and steel industry of these districts is intimately bound up with the mining development of Lorraine.

It is not to be overlooked, however, that Germany in recent years has been a heavy importer of iron ore. While the bulk of this raw material in the pre-war period came from domestic sources the proportion supplied by foreign countries was increasing.[1] In 1913 the importation of iron ore amounted to over 14,000,000 tons, of which 4,558,000 tons came from Sweden, 3,811,000 tons from France and 3,632,000 from Spain.[2] The significant importation from France, however, represents a supply from the same source as the domestic output, but on the other side of a political boundary line.

The French iron and steel industry has been even more dependent upon Lorraine ore than the German. The manufacture of iron and steel, however, notwithstanding the great ore production and reserves of the country, has undergone no such striking development as in Germany. The iron-ore resources of France were nearly as great as those of her neighbor, and the deposits of French Lorraine has been estimated at a higher figure than those of German Lorraine. Nevertheless, while the output of pig iron in Germany in 1913 amounted to 19,291,920 tons, that of France was only 5,311,316 tons.[3] During the same year Germany produced 18,958,819

[1] Commercial Relations of the United States, 1912, published by the Bureau of Foreign and Domestic Commerce, pp. 36–39. In 1911 the importation of iron ore into Germany amounted to 10,820,485 metric tons, and in 1912, to 12,120,090 metric tons.

[2] Iron Trade Review, January 2, 1919, p. 30.

[3] Mineral Industry for 1917, p. 346. The figures are given in metric tons (2,204.6 pounds).

tons of steel, and France only 4,419,241 tons.[1] In other words, France with an iron-ore production equivalent to about two-thirds that of Germany (including Luxemburg) and reserves nearly as great had a pig-iron output considerably less than one-third and a steel production of less than one-fourth.

French iron and steel manufacture absorbed only a part of the country's output of ore. The situation may be indicated by comparing the production with the apparent consumption in the two calendar years immediately preceding the outbreak of war.

CONSUMPTION OF IRON ORE IN FRANCE, 1912 AND 1913[2]

	1912 (tons)	1913 (tons)
Production	18,858,668	21,572,835
Imports	1,454,190	1,417,063
Exports	8,323,712	9,745,863
Apparent consumption	11,989,146	13,244,035

In 1912 the net exports of iron ore of France amounted to 6,869,522 tons with an apparent consumption of 11,989,146 tons, or less than two-thirds of the year's production. In 1913 the net exports were 8,328,800 tons, or considerably more than one-third of the annual production, leaving for home consumption 13,244,035 tons. In other words, the net exports of iron ore from France in the years just prior to the war were about 35 per cent of her annual production. In contrast with this, Germany's imports of iron ore for the same two years were 12,120,090 and 14,017,000 tons respectively, and her

[1] Mineral Industry for 1917, p. 347. The tonnages for steel are given in terms of ingots and castings. A slightly higher figure is given in the Iron and Coal Trades Review, April 10, 1914, p. 541, for the production of steel in France.

[2] Mineral Resources of the U. S., 1915, p. 318, and Mineral Industries during 1913, p. 418.

annual exports only a little over 2,000,000 tons.[1] Germany with an iron-ore production considerably larger than that of France, and including within her tariff boundary line the added output of Luxemburg, had in 1912 and 1913 a net importation of ore equivalent to about one-third of her domestic production.[2]

The war just closed has, by the restoration of Alsace-Lorraine, added to the already great reserves of France the deposits from which the German iron and steel industry has drawn the greater part of its ore. Will this addition result in the transfer of this great industry to France? Does the loss of Lorraine mean the complete or partial demoralization of German steel manufacture?

It is evident that many French writers and statesmen look forward to a development of the iron and steel industry in France corresponding to its wonderful growth in Germany in the pre-war period, and probably greatly surpassing it. The support which the German industry gave to the military operations of the Central Powers has given birth to a desire on the part of many to see this industry in Germany crippled, or at least its Continental leadership taken away.

It is well known that in the manufacture of iron and steel a large amount of coal is consumed. It is also well known that while France possesses some important coal deposits her coal resources are not very extensive and her consumption of coal far exceeds her production. The Lorraine district which has been recently added to her territory brings with it no material addition of coal. The redistribution of territory between France and Germany

[1] Bureau of Foreign and Domestic Commerce: Commercial Relations of the United States, 1912, pp. 36, 39, and Iron Trade Review, January 2, 1919, p. 30.

[2] The production of iron ore in Germany (including Luxemburg) in 1912 was 33,180,258 metric tons and in 1913, 34,103,598 metric tons (26,771,598 for Germany proper and 7,332,000 for Luxemburg). Mineral Resources, 1915, p. 318, and Iron and Coal Trades Review (London), November 5, 1918, p. 517.

virtually amounts to putting iron ore on one side of a political boundary line and coal on the other.

This division of material resources would not seriously affect the economic situation if iron ore and coal were left free, or relatively so, to pass between the two countries under consideration. But this freedom comes into conflict with a strong national purpose to keep French ore at home and make it contribute to the upbuilding of a great iron and steel industry in France. Furthermore the Germany industry being looked upon as something of a military, as well as a commercial, menace Lorraine ore must no longer constitute its basis as in the past. The old interchange of French ore for German coke is pronounced out of question.[1]

How far a political or patriotic purpose can modify an industrial condition depends upon a number of factors. An unwise fiscal policy can injure and sometimes destroy an industry. A tariff barrier may interrupt or change the normal current of trade. But the enactment of a legislative body or the decree of an international council cannot change natural resources or alter geographical facts. Political boundary lines, it is true, may be made to conform to such conditions, but the successful consummation of any political aim depends upon its adaptation to the natural and economic possibilities of the situation.

Are those who look forward to a rapid and extensive development of a French iron and steel industry based upon Lorraine ore justified in their anticipations? Or do such anticipations come into conflict with an economic condition?

It is unsafe to make predictions, as there are many circumstances in the present industrial situation, the

[1] The situation is discussed in a series of articles published in L'Information by M. C. Marquet (Ingenieur Civil des Mines).

influence of which it is impossible to gauge. However, certain facts in this situation may be pointed out, and a rough estimate made of their probable influence. Some of these facts are well-known and appreciated, and others are popularly ignored.

In the manufacture of some iron commodities and most articles of rolled steel, the consumption of coal (including coke) is greater than that of iron ore. The oft-repeated statement that it takes more coke than ore to produce a given amount of pig iron is not true of the product of the blast furnace of today. The tendency for the ore to move toward the coal rather than for the coal to travel toward the ore cannot be explained by the relative quantities of ore and coal necessary to produce a ton of pig iron. This can be seen by comparing the proportionate amounts of material entering and leaving a modern blast furnace when a ton of pig iron is manufactured out of ordinary ore containing about 50 per cent of iron:

Entering the Furnace	(tons)	Leaving the Furnace	(tons)
Iron ore	2	Pig iron	1
Coke	1	Slag	0.5
Limestone	0.5	Gases	6
Air	4		
	7.5		7.5

It will be observed that in the case of 50 per cent iron ore the approximate proportion of coke to ore used in the smelting process is one to two. In the case of low-grade ores the coke consumption is greater, but less than the quantity of ore used. In the manufacture of coke the amount of coal consumed varies considerably, but with superior grades four tons are required to make three tons of coke.

The greater part of the pig-iron production of the world is converted into steel.[1] In 1916 the pig-iron production of the United States amounted to 39,434,797 gross tons, and the steel output (in terms of steel ingots and castings), to 42,773,680 gross tons.[2] In 1913, as has already been noted, the pig-iron production and steel output of Germany were 19,291,920 and 18,958,819 metric tons, respectively, and the corresponding figures for France were 5,311,316 and 4,419,241 metric tons.[3] It is especially in the advanced stages of steel manufacture that the aggregate fuel costs mount high enough to make it an object for the producer to be nearer his coal supply than his sources of iron ore. In the production of certain forms of rolled steel the amount of fuel consumed is as much as four tons of coal to one ton of steel.[4]

In addition to this influence operating on the producing side of steel manufacture is that of the desirability of being near the leading markets for steel goods. The bulk of the steel consumed under modern industrial conditions takes the forms of railway material including rails, structural shapes, heavy machinery, plates, and the like, and the principal markets for such products are in great manufacturing centers located near coal-producing regions.

As long as coal remains the most important source of power in the operation of modern machinery and its consumption per unit of steel output continues to be practically what it is at present, the iron and steel industry will tend to seek the coal area. Lake Superior ore will

[1] The conversion usually takes place in one heat, i.e., the iron is not allowed to cool before bringing it to the Bessemer converter or the open-hearth furnace.

[2] Annual Statistical Report of the American Iron and Steel Institute, 1916, pp. 3 and 23. The apparent statistical discrepancy in the outputs of pig iron and steel is explained by the large use of scrap material in steel manufacture.

[3] Mineral Industry for 1917, pp. 346 and 347.

[4] The writer is indebted for this information as well as other technical details embodied in this article to Bradley Stoughton.

move toward Pennsylvania coal rather than Pennsylvania coal toward Lake Superior ore.[1] Swedish ore will travel toward German and English coal rather than the coal in the reverse direction.

The situation with respect to coal, brought about by the restitution of Alsace-Lorraine to France, may be considered with reference to the coal production and trade of that country in comparison with that of Germany, the comparative resources of the two countries in the bituminous product and the efforts and proposals of French writers and statesmen to meet the situation.

The production of coal in France and Germany, in the two calendar years immediately preceding the war, given in short tons, were as follows:[2]

	1912	1913
France	45,534,448	45,108,544
Germany	281,979,467	305,714,664

The output of Germany in each of the years considered was between six and seven times that of France. In both France and Germany production was largely concentrated in a few districts. About 70 per cent of the output of France came from the Nord and Pas-de-Calais districts — the latter producing about half that of the country.[3] The mining of coal in Germany, while operated on a fairly large scale in various parts of the country, is most extensively carried on in the Ruhr district, the output of which was about one-half that of the empire in 1912 and 1913.[4]

[1] There have been some apparent movements in the United States which seem to contradict this principle, e.g., the organization of the Minnesota Steel Co., a subsidiary of the United States Steel Corporation, at Duluth, Minn. Coal is shipped from lower Lake ports to Minnesota. It should be remembered, however, that coal is carried on the Great Lakes at exceptionally low rates and as a return cargo for ore-bearing steamers. Furthermore, the company produces heavy steel for markets in the Northwest — particularly railroad material, structural shapes, etc.

[2] Mineral Industry for 1917, p. 127.

[3] Ibid., 1913, p. 118.

[4] Ibid., 1913, p. 119.

In both countries the production of bituminous coal exceeded that of anthracite [1] and lignite. In Germany much of the bituminous product makes good coke.[2] In 1913 the production of coke in Prussia amounted to 34,000,000 tons.[3] In France, on the other hand, good coking coal is scarce, and in 1913 the French output of coke was only about one-tenth that of the Prussian production.

The coal and coke consumption of France far exceeds her production. In 1913 the coal imports amounted to 18,693,123 tons, this importation being an increase of more than 2,700,000 tons over that of the preceding year.[4] During the same year the French consumption of coke for metallurgical purposes was about 6,500,000 tons,[5] but of that consumption 3,070,036 tons were imported. Considerably over half the imported coal came from Great Britain, and about four-fifths of the coke from Germany.[6]

In contrast with this, German coal and coke production exceeds consumption. For many years Germany has been one of the world's great exporters of coal. In 1913 the net exports of coal from that empire aggregated over 24,000,000 tons, and those of coke about 6,000,000 tons.[7]

[1] A small amount of anthracite is produced in both France and Germany, but it is inferior to the anthracite of eastern Pennsylvania and South Wales.

[2] Coke is a product of bituminous coal, but not all bituminous coal is coking coal. Experiment is necessary to determine whether a given coal has the qualities necessary for making good coke. These qualities cannot be stated in chemical terms alone. See Tiemann, Iron and Steel.

[3] The Iron and Coal Trades Review (London), December 13, 1918, p. 673.

[4] Mineral Industries during 1913, p. 118.

[5] The Iron and Coal Trades Review (London), December 6, 1918, p. 633.

[6] Mineral Industries during 1913, pp. 118–120.

[7] Ibid. The exports of coal and anthracite were 34,573,514 tons, and the imports were 10,540,018 tons. The coke exports amounted to 6,411,418 tons. There was a small importation of coke from Belgium.

The coal reserves of France, as estimated in 1913,[1] do not promise very much in the way of any large permanent increase of output. The reserves of bituminous coal, which is the fuel of iron and steel manufacture as well as of other manufactures, were estimated for France, Germany, and Europe as follows:[2]

(000's omitted)

Countries	Actual reserves	Probable reserves	Total
	(tons)	(tons)	(tons)
France	3,622,000	9,058,000	12,680,000
Germany	94,865,000	315,110,000	409,975,000
Europe	236,716,000	456,446,000	693,162,000

The largest reserves of bituminous coal in Europe are in the Belgian-German basins. The British fields are more easily exploited and a larger percentage of their reserves extracted.[3] But the basins named, particularly Germany, have much larger amounts. Of the total estimated European reserves of bituminous coal (actual and probable) nearly 60 per cent is in Germany and less than 2 per cent in France.

The coal reserves of France and Germany remain practically unaltered by the transfer of Alsace-Lorraine to France. The distribution of the bituminous coal reserves within Germany shows that this transfer affected no appreciable change in the fuel situation.

[1] A survey of the coal reserves of the world similar to that of the iron-ore resources was undertaken by the International Geological Congress held in 1913 in Canada. The results were published in three large volumes under the caption "The Coal Resources of the World."

[2] The Coal Resources of the World, vol. i, pp. xxxv and xxxvii. These reserves are divided in the case of Europe into "actual" and "probable." Actual reserves are those where the actual thickness of the seams can be arrived at, and probable reserves are those where an approximate estimate only can be made.

[3] The Coal Resources of the World, vol. i, p. xxvi.

BITUMINOUS COAL RESERVES OF GERMANY BY DISTRICTS [1]
(000's omitted)

Districts	Actual reserves	Probable reserves	Total
All Germany	94,865,000	315,110,000	409,975,000
Saar district	16,548,000	....	16,548,000
Westphalia	56,344,000	157,222,000	213,566,000
Lower Silesia	718,000	2,226,000	2,944,000
Upper Silesia	10,325,000	155,662,000	165,987,000
Saxony	225,000	....	225,000
Left of Rhine	10,458,000	....	10,458,000
Other districts	247,000	....	247,000

Of the districts tabulated — and they include all the bituminous coal reserves of the former German Empire — only that designated left of Rhine covered any part of the Lorraine region, and that only in a limited degree. The Saar district is in very close proximity to the Lorraine field. The Westphalian district, which is by far the largest and most highly developed of the coal regions of the country, has been the principal seat of the iron and steel industry of Germany. This industry has depended in the main upon ore from German Lorraine and to a limited extent upon supplies from the adjoining field in France.

The relatively restricted supply of coal has been the cause of the high prices charged for that fuel in France. Figures have been published concerning average prices of coal in France, and comparisons made with the corresponding prices in other countries. Recently these figures have been used for determining the effect of fuel costs upon the prices of iron and steel goods,[2] and the results are significant. In 1913 according to these esti-

[1] The Coal Resources of the World, vol. i, p. xxxvi.

[2] An account of these computations is given in the Iron and Coal Trades Review (London), January 10, 1919, p. 47. In stating the figures the writer has converted them into American currency.

mates the price of French coal at the pit was $3.32 per ton and that of imported coal $4.74. Worked out on the basis of the amounts produced in the country and imported the average price was $3.55 per ton. This average exceeded that of the United States by $2.28, that of England by $1.32, and that of Germany by $0.96. In the case of home-made coke the average price in France was $4.37 per ton, and that of imported coke $5.63, with an average price for both of $5.11. This estimate exceeded the averages of the United States, England, and Germany, by $2.69, $1.76, and $0.82, respectively.

These figures have been used to show that the normally high prices of pig iron and finished steel material in France are, to a great extent, the result of the cost of coke and coal. The production of a ton of pig iron requires not less than a ton of coke, and generally in Europe, appreciably more. The conversion of this pig iron into finished product necessitates the use of at least a ton of coal, and in some cases two or more tons. Higher fuel prices are thus an important factor in increasing iron and steel costs in France over those of the United States, England, and Germany. A computation based upon similar but somewhat later figures, made by M. de Nanteuil, State Mining Engineer, shows that the cost of producing pig iron is increased in France because of the higher cost of coke by $1.35 per ton over that of Belgium, $2.71 per ton over that of Germany, $4.07 over that of England, and $4.87 per ton over that of the United States.

While these calculations may not be in all cases accurate and may even contain some serious errors, they do show how the high fuel prices prevailing in France have affected iron and steel costs and limited the competitive strength of the French iron and steel industry. Unless the fuel problem is solved iron and steel manufacture in

France seems destined to be carried on at high cost, or Lorraine ore to continue to serve the steel mills of Germany. The latter alternative is deemed by Frenchmen out of question.[1]

The significance of the situation is fully appreciated in France. Reasons other than large ore deposits influenced Frenchmen to look forward to the restoration of Alsace-Lorraine. The iron-ore deposits, however, constitute by far the most valuable natural resource of these provinces, whose economic development depends in large part upon their exploitation and utilization. To promote this development without making French ore subsidiary to German iron and steel it has been suggested and strongly advocated that the Saar basin to the northeast be annexed to Lorraine.[2] This district, as has already been pointed out, is one of the prominent coal-producing regions of Germany. It has also been the seat of a flourishing iron and steel business, which like the more important manufacturing district of Westphalia has depended upon Lorraine ore.

The Saar district, however, while containing large coal deposits, only meets the situation partially. Its resources are not commensurate with the enormous demands which would be made upon it in the event of such a growth in the French iron and steel industry as is anticipated by certain writers. The coke production of the district is neither large nor high in quality. Thus out of a total output of 17,846,000 tons of coal in the basin of the Saar in 1913, only 3,292,000 tons were converted into coke,[3] which was consumed for the most part locally. Furthermore finely washed coking coal in this district yields only 65 per cent coke, whereas the superior coking

[1] The Iron and Coal Trades Review (London), December 6, 1918, p. 633.

[2] Bulletin of the American Institute of Mining Engineers, September, 1918; Iron and Coal Trades Review, January 10, 1919; Washington Post, January 13, 1919.

[3] The Iron and Coal Trades Review (London), January 10, 1919, p. 47.

coal of Westphalia and of England yields from 72 to 76 per cent coke.

It is reported that during the war means have been discovered for coking at a low price coal hitherto declared to be unsuitable for the purpose. While it is true that only laboratory tests have been applied, it is considered beyond doubt that so far as coke manufacture is concerned an industrial solution is in prospect. With such a solution it is held that the incorporation of Alsace-Lorraine and the Saar, after deducting the needs for domestic consumption, gas works and railroads, would result in a production of 12,000,000 tons of coal capable of being transformed into coke [1] and rendered available for the blast furnaces of France. Twelve million tons of coal would, under the new processes referred to, make from 8 to 9 million tons of coke — or between two or three times the domestic output of France in 1913, but only about one-fourth the production of Prussia during the same year. Assuming all considerations of language and present ethnic relationship on the part of the people of the Saar district to be set aside and the region incorporated with Lorraine, the prospective development of a great French iron and steel industry commensurate with her enormous ore supplies would still confront a fuel problem.[2]

The effect upon Germany of the loss of Lorraine will depend very largely upon the policy adopted by France with regard to the exportation of ore to her neighbor. It has already been noted that the German iron and steel industry has in the main been based upon the Lorraine ore field. This relationship extended not only to Ger-

[1] The Iron and Coal Trades Review, January 10, 1919, p. 47; Bulletin of American Institute of Mining Engineers, September, 1918.

[2] It has been reported that at the Peace Conference in Paris, those of the French who strongly advocated the annexation of the Saar basin to provide coal have receded from their position. Iron Age, January 30, 1919, pp. 315 and 316. The temporary control of this region by the French, however, seems to have been agreed to as part of the indemnity to be paid by Germany to France. Washington Post, April 2, 1919.

man Lorraine, but to the part of the field embraced within Luxemburg and to a less extent to the district within France. If the supply of ore is cut off from all that part of the Lorraine region now to be embraced within the boundaries of France, Germany will be shut out from sources which supplied over 50 per cent of her iron ore in 1913, including her large importation.

The situation for Germany in the event of the elimination of these sources of ore supplies is even worse than this. The mining interests of Luxemburg are closely associated with those of Alsace-Lorraine, and if the iron ores of the latter become a basis for a great French iron and steel industry, Luxemburg is likely to become associated with France, and to separate from the German Customs Union. A statement recently made by the general director of the Burbach-Eich-Dudelingen Company and the reservations he made in connection with the provisional prolongation of the Steel Syndicate lead to the conclusion that this possibility exists.[1] In 1913 Luxemburg produced 7,332,000 tons of ore, or over one-half million tons more than the German Empire outside of Lorraine.

It has been contended that Germany may still look abroad for the greater part of her ore. Large quantities of Swedish and Spanish ores were being imported prior to the outbreak of hostilities. This importation, however, would have to be increased manyfold to compensate her for the loss of Lorraine, and preserve her iron and steel industry on the pre-war level.[2] If iron ore no longer moves from Lorraine to the Rhenish-Westphalia and Saar districts (assuming that the latter remains a

[1] The Iron and Coal Trades Review (London), December 6, 1918, p. 633, and November 29, 1918, p. 611.

[2] The difficulties which the Germans have experienced in securing iron ore in other countries is treated in a report from Consul General Halstead at Stockholm to the Bureau of Foreign and Domestic Commerce. See also Iron Age, January 30, 1919, p. 329.

part of German territory) the backbone of the present German iron and steel industry will be broken.

A confidential German document, which has recently been published by the Comite des Forges de France and quoted in the *Iron Age*,[1] gives some idea of the attitude of steel producers in Germany toward the control of the sources of iron ore, both from an industrial and a military standpoint, and also shows the cause of the apprehension naturally felt in France with regard to furnishing the raw material for German iron and steel manufacture. This document, which was probably written at a time when Germany was confident of a victory, emphasizes the determination of that country to take possession of the French mines, considered imperatively necessary in order to insure the future prosperity of the iron and steel industry of Germany. After pointing out that for many years Germany has been obliged to depend on other countries for a part of its supply of ore it remarks that " our mining base enlarged by the addition of Briey and Longwy would insure for a century the future of our iron industry, and would hence insure also our retention of the place which, with the help of the iron ore of Lorraine, we have conquered during the last ten years among the iron-making countries of the world, at the cost of hard struggles with Great Britain."

It also states that the greater the iron and steel-making resources of a country the more it is dreaded as an adversary. It then goes on to say that the displacement of the Lorraine frontier is absolutely indispensable for the safety of the German Empire in the case of a future war, and adds further:

" All of Lorraine in the hands of Germany would constitute not only a war indemnity and a support for the

[1] Iron Age, February 20, 1919, p. 506.

German fatherland, but also a guarantee of a lasting peace and a gauge for the security of the empire. Our victory gives us the occasion and the right to add to the most vulnerable point of attack on the German Empire a sharp rock against which every enemy assault will be broken.

"If this opportunity be neglected, the German people will in a future war be doomed to ruin."

The failure of Germany to secure the displacement of the Lorraine frontier in the manner contemplated is looked upon in that country as a calamity to its steel industry,[1] involving as it does not only a loss of political control over an area deemed necessary to national safety but a possible elimination of the most important source of its supply of raw material. The German industry still entertains some hope that France's need for fuel will ultimately force her to exchange ore for coke; but any tutelage in regard to coke is what France sincerely desires to avoid.

The attitude of France with reference to the exportation of iron ore is of course intelligible in the light of the experiences through which she has passed and in the face of exposures like the document above cited. It is not to be attributed to commercial particularism with which France has sometimes been charged. The ambition to make her enormous ore resources serve a home industry rather than the industry which was lately used by a powerful neighbor to despoil her of those resources is laudable from both a patriotic and ethical standpoint. The fact remains, however, that metallurgical processes being what they are and the resources of Continental Europe in ore and coal distributed in the manner above

[1] The Iron and Coal Trades Review (London), December 6, 1918, p. 633; Iron Age January 30, 1919, p. 329.

described [1] the economic feasibility of any taboo on an interchange of ore and coke between France and Germany, is, to say the least, very questionable. The iron ore problem of Lorraine, viewed in the light of the present technical processes of iron and steel manufacture, is a good example of how political aspirations and ethnological considerations may come into conflict with an economic situation.

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[1] France is well supplied with water-power which would be available if electric steel could be made as cheap as Bessemer and open-hearth. The progress in the manufacture of electric steel, while great, does not at present promise much in the way of supplanting the product dependent directly upon coal and coke.

NOTES AND MEMORANDA

A PECULIAR EIGHT HOUR PROBLEM

SUPERFICIALLY, it would appear as if the problem of payment for longshore labor in loading and discharging cargo would be relatively simple, especially by contrast with the complicated schedules of railroad employees. But the occurrence of many local customs and the variety of practice between different ports introduce elements of confusion, well illustrated in the following cotton rollers' case.

Longshore labor engaged in loading cotton bales at New Orleans is divided into gangs; and each gang is made up of so-called screwmen, who work in the ship's hold, and of so-called rollers, who wait on these gangs on the dock. The task of the latter group is to head the cotton, that is to say, to keep a supply of bales headed up on end within convenient reach of the screwmen who stow it into place. This work of the roller is not laborious comparatively, nor does it require any skill. But, on the other hand, it is more or less intermittent, depending upon the activity of the screwmen, the supply of bales and the particular needs of the ship's hold. Moreover, the cotton rollers are expected to leave the dock in good condition with bales safely covered with tarpaulin and neatly stacked. In addition, the cotton rollers, " waiting on gangs," are dependent for their hours entirely upon the screwmen; and the screwmen at New Orleans have always enjoyed the custom of a half-hour rest period at 9 o'clock and at 3, known as lunch or whiskey time. During this interval the roller is not supposed to work except upon cotton, and customarily this hour has come to be one of enforced idleness.

The above mentioned local conditions do not prevail at Galveston where the roller is a part of the gang and is paid like the others by the bale. Moreover, no half-hourly rest periods have ever been granted. There are no stevedores or middle-

men as at New Orleans where the steamship companies contract with the stevedore by the bale, while he in turn arranges for his labor on the basis of time.

The introduction of the eight hour day by an award of the National Adjustment Commission in October, 1918, brought about a substantial increase in wages all along the line. The hourly rate for longshoremen was increased from 50 cents to 65 cents; and the working day was brought down to the eight hour limit. But this change affected the cotton rollers peculiarly. Formerly, they always received ten hours' pay, from 7 A.M. until 6 P.M.; altho actually, owing to attendance upon the screwmen, their working hours were only eight. In other words, they stopped when the screwmen stopped at 5 o'clock, an hour ahead of general cargo men; and they also enjoyed the two half-hours of relaxation, over and above the dinner hour. This advantage of the cotton roller, which formerly compensated him for the intermittency of his work was automatically changed into a disadvantage when the general cargo men began to close their working day at 4 o'clock. Under the new conditions the roller still worked until 5, waiting on the screwmen, who were content as before with their conditions, which were in effect, as above described, already eight hours. Large numbers of workers were affected by these conditions, and the port of New Orleans was tied up by a failure of the various parties to come to an agreement. It was to settle this strike that the award printed herewith was handed down.

There were four possible money settlements to be awarded. The extreme demand of the rollers was for ten hours' pay for eight hours' work at 65 cents per hour. They contended for $6.50 per day, upon the ground that the screwmen, whose time they followed, had always been on an eight hour day and were not affected by the changed schedule at all. A second settlement was actually made by some companies upon the basis of eight hours at 65 cents, with $1.00 — the prescribed overtime rate — for the ninth hour. The sum of $6.20, in other words, would pay the men for waiting about during two lunch periods of a half-hour each and actually reward them at the full overtime rate despite this circumstance. Many

employers contended that this was unjust to them. A third choice proposed payment of the straight hourly rate of 65 cents for nine hours' work, which was the outside limit of the roller's working day, as it had always been. This would have given a daily wage of $5.85. And then, finally, some employers contended that, in view of the actually enhanced hourly rate, the eight hour day should be paid for at the rate of 65 cents for eight hours only, such being the number of hours really worked. This would have given the rollers $5.20 for staying on the piers until 5 o'clock, whereas the general cargo men concluded their eight hours at 4 o'clock, and drew the same pay.

The opposing contentions were finally settled by the award which is reprinted herewith, and which is offered as a significant example of interpretation. One way to settle the strike would have been to make an entirely new adjustment, striving to adjust the rollers' wages to those of general cargo men, purely upon industrial or economic merit. But such an industrial settlement had to be aligned with the content of the several contracts and awards which were then in effect. So that the final decision, necessary to claim allegiance of all parties concerned, had to be at once economically just and strictly logical. In other words, it had to be both good law and good industrial practice. In a long, fairly extended experience in these matters, I have seldom felt more completely satisfied that these two modes of approach were comprehended than in this case. And the best evidence, practically speaking, was that despite the large financial interests involved, a unanimous finding was had. The peculiarity of many of these proceedings is that the leading counsel for either side is apt to be chosen as members of the board of award. These attorneys thereafter sit upon the bench and vote upon their own arguments. It was a tribute to the inevitableness of this determination that despite the bitterness of feeling which formerly prevailed, a unanimous opinion was handed down.

WILLIAM Z. RIPLEY.

Decision Rendered by Special Adjustment Board in the Controversy between the Stevedores and Longshoremen's Benevolent Association, New Orleans, La., and New Orleans Steamship Association and Stevedores in the Matter of Wages of Rollers of Cotton and Tobacco, February 24, 1919.

The task submitted to your Wage Adjustment Board is the interpretation of an existing contract and of two official awards thereunder. No power to make new rates of wages by agreement was conferred. The original agreement is a contract between the longshoremen and the steamship agents for a period of three years from September 16, 1917. Two subsequent awards dated November 2, 1918, were made by the National Adjustment Commission for the cotton screwmen and for "general longshore work" respectively. The first of these awards for the screwmen changed the rate of wages, but introduced no change in the working hours for cotton gangs, leaving them at nine hours per day; namely, from 7.00 A.M. to 5.00 P.M. as outside limits. The second award for "general longshore work" not only increased the rate of wages from 50 cents to 65 cents per hour, but it also introduced a basic working day of eight hours from 7.00 A.M. to 4.00 P.M. with $1.00 per hour for overtime.

The precise point submitted for determination is as to the standard day's compensation for longshoremen waiting on cotton and tobacco gangs, both under these two awards and under the unexpired original contract.

First: Longshoremen waiting on gangs stowing cotton or tobacco are in no way specifically mentioned either in the award for screwmen or for "general longshore work." The second clause of the general longshore award merely states that "general cargo men" shall receive 65 cents and $1.00 per hour. But in addition it specifies differential rates for handling grain, cement, bananas and other commodities. It has always been the custom of the port to regard cotton and tobacco gangs as engaged in a service separate and distinct from that of general cargo. Thus the omission of any mention of cotton or tobacco rollers would seem to exclude them entirely from the changes introduced by the award for "general longshore work." But, on the other hand, examination of the record of the hearing on October 30, 1918 proves that it was the intention to include them under this award. Your Board finds, therefore, that cotton and tobacco rollers are entitled to the increased rate of 65 cents per hour from and after the date of the award.

Second: If, under Section 2 of the general longshore award, the men are entitled to the new rate of 65 cents per hour, the intention is established of applying this award in general to them as well as to general longshoremen. But the award, if applied as to Section 2, must be held to apply as regards Section 1, which introduces a basic eight hour day. There is no escape from this logic. It is the invari-

able practice not only of courts but of all arbitration tribunals to require that the whole of an instrument applies if any part thereof is applied. Your Board finds, therefore, that the basic eight hour day was intended to apply to cotton and tobacco rollers. They cannot be found entitled to the new rate of 65 cents while still working under a ten hour schedule. Either one or the other might hold good, according as they are comprehended under the award or not. But both cannot possibly apply.

Third: Cotton and tobacco rollers have, both before and after these changes, worked on a nine hour basis waiting on the screwmen's time; namely, until five o'clock P.M. If, however, as already held, they are entitled to a basic eight hour day ending at 4.00 o'clock, your Board finds that they are entitled to overtime at the rate of $1.00 per hour for the additional service up to 5.00 o'clock. This fixes the standard pay for a day's work at $6.20; namely, eight hours at 65 cents and one hour of overtime at $1.00.

The foregoing interpretation is based upon the awards of the National Adjustment Commission. It is necessary to justify the foregoing rate also by the terms of the original contract between the longshoremen and the steamship agents. This contract contains the following clause:

> "Members waiting on gangs shall receive gangs' time in the full sense of the word."

It is agreed by all parties, as already stated, that the time of a cotton or tobacco gang has remained unchanged at nine hours. This clause, therefore entitles them to pay for nine hours work. The proper compensation for nine hours work under a basic eight hour day is identical with that already figured at $6.20. This calculation based upon the contract therefore agrees literally with the calculation based upon the award.

In the application of the foregoing interpretation we hold furthermore that longshoremen waiting on cotton or tobacco gangs, shall be paid for the customary lunch hours of cotton screwmen — namely, 9.00 to 9.30 A.M. and 3.00 to 3.30 P.M.

W. Z. RIPLEY, *Chairman*,
W. H. HENDRON (*For steamship agents*),
J. E. BYRNES (*For the longshoremen*).

COST OF PRODUCTION AND PRICE

INTERESTING questions of theory are raised by Dr. Taussig's article on price-fixing. What are the economic forces that determine long-run or normal price? At one time economists were content to say that it was the cost of production. When it was discovered that there were many costs of production, the question arose, which? The question had already been answered in the case of commodities subject to the law of diminishing returns that it was the highest or marginal cost. President Walker then attempted to extend the same doctrine to all commodities with his well-known theory of the "marginal entrepreneur" and "rent of ability." There were different degrees of fertility in gray matter as well as in land. In this theory the normal price is clearly the cost of production to the least efficient entrepreneur, whom the increasing demand for the product calls into being.

Recent economists, while adhering to the doctrine of marginal cost as a price-determinant in the case of commodities subject to the law of diminishing returns, have been disposed to accept Marshall's theory of the representative firm in the case of commodities subject to the law of constant or decreasing cost. It is not towards the cost of production to the least efficient producer that price gravitates, they say, but to that of the well-established, solid business man — the man doing a conservative, prosperous, but not phenomenally brilliant business. The latter, the great "captain of industry" may be conceded, even in Marshall's theory, to reap a rent of ability. The high-cost producers, those whose costs are greater than that of the representative firm, are not tending to establish normal price, they are tending to effect their own elimination. Every year a sheaf of failures is thrown off, but every year a new sheaf of failures appears. The individuals change, the class is constant.

It may be remarked as a comment on this theory that a single year is too short a period to determine which of the

competing firms is the representative firm whose cost determines normal price. Accident, a poor season, the newness of the business bring it about that every year some of the competitors produce at a cost higher than the price, and hence are doing business at a loss, who nevertheless in the long run are doing a profitable business. Such will ordinarily be the history of the hypothetical representative firm itself. Good years will offset bad years. However, making allowance for such vicissitudes and taking long-time averages, Marshall's theory appears to be more in harmony with facts. It is not the highest-cost firm nor yet the lowest-cost firm that determines normal prices, it is a firm somewhere intermediate between them.

But, after all, Marshall's theory is supplementary rather than antagonistic to Walker's. President Walker was applying economic reasoning to a human society much as a mathematician applies the principles of applied mechanics to the construction of a bridge. He works out his strain sheet as tho all the struts and ties were mathematical lines, as tho they were uniform in texture throughout, as tho they met at geometrical points. He knows as well as the practical bridge builder that not one of these conditions is realized in fact. Yet his strain sheet is none the less valuable and, even after allowing an adequate coefficient of safety, results in great saving of material. So Walker for the purposes of theory assumed a standardization, a fluidity in the action of economic forces operating in a human society which he would probably have been the first to admit is not to be realized in fact. The moment the supply of commodities which the most efficient entrepreneur is able to turn out is insufficient to meet the demand, and a rise of price follows, he supposes another entrepreneur to step in of precisely the right degree of mediocre ability just barely to reimburse himself at the slightly advanced price.

Now what Walker assumed in regard to different grades of entrepreneurs is precisely what Ricardians assume in regard to land. They also are presenting for the purposes of theoretical reasoning hypothetical conditions which they know well

enough can never be more than roughly approximated in actual life. There will always be a fringe of land that is worked at a loss. The cost of production that determines or, better, equals normal price is never the marginal in the sense of highest cost of production. A certain number of producers will always be found occupying land which is as yet of too low a grade to reimburse them at the current price of the product. Even if land could be conceded to be taken up step by step in infinitesimal gradations, the human factor cannot be omitted. Even then it would be the representative firm operating marginal land that would produce at the price-determining cost. The business genius or the business weakling operating marginal land would produce at a cost, the one less, and the other more than the normal price. In short the two theories are seen to be in fact the same theory, except that in one an attempt is made to adjust reasoning, applicable to an hypothetical society, to an actual society. Walker's marginal entrepreneur operating in a conceptual society becomes Marshall's representative firm operating in an actual society.

But when this is admitted we seem at once to make the whole theory valueless for any practical application. So long as we could conceive ourselves to be working in a society, shall I say, geometrically perfect, we had only to collect from all firms statistics as to their costs of production, tabulate the costs in order, and then note which was the highest, in order to determine the normal price. But if the marginal cost or the representative firm cost is not the highest, which one is it? We are driven, perforce, to reverse the process, to determine by averaging price data what is the normal price, find which of the costs is equal to it and call that cost the marginal or representative firm cost. That is, we make normal price determine marginal cost. Having done this, to go on and say that it is marginal cost which determines normal price is to reason in a circle. In truth, neither does marginal cost determine price, nor does price determine marginal cost. Both are results of a more primitive underlying force. That efficient force is human want measuring itself against resistance, whether the resistance be the limitations of nature or human

nature, land or brain. Under the impulse of this underlying force, as human want, manifesting itself in demand, presses against land and brain limitations there result a price and a series of costs, tangible evidences and measures of both want and resistance. Among these costs one will be found equal to the price, and so long as the conditions of want and resistance remain the same that cost and price remain the same. The price, so determined, may be called "normal." Whether we call the cost "marginal" or "representative" is a matter of terminology. In the cost curves so far examined it is found to be near the right hand extremity, indicating that by far the greater portion of the output is produced at a cost equal to or less than that cost. For it, therefore, the term "marginal" is objectionable in that it is too uncompromising; it suggests the absolute last term of the series, the highest cost. "Representative" is objectionable in that it is too compromising; it somehow suggests an average or modal cost, whereas, as just stated, it is ordinarily very near the end of the series. Provisionally, however, and subject to the above explanation, the term "marginal" will be employed in this paper when referring to the cost which is equal to the normal price.

The above analysis is not inconsistent, as might appear at first blush, with the doctrines of constant and decreasing cost. It is merely necessary that they be modified to adapt themselves to an actual society instead of the mentally fabricated society with reference to which they are ordinarily discussed. "Constant cost" implies, that however much the output be increased the price-determining cost will be neither increased nor diminished. It is usually represented by a straight horizontal line, thus adding to the concept of constant cost another concept, unnecessary even for the fictitious society of the economist, that it is also uniform. Even in such a society, if the theory of the "rent of ability" be admitted, it should be an ascending line, with the proviso that as demand increases it should always ascend to the same level at the point where it meets the demand curves, thus:

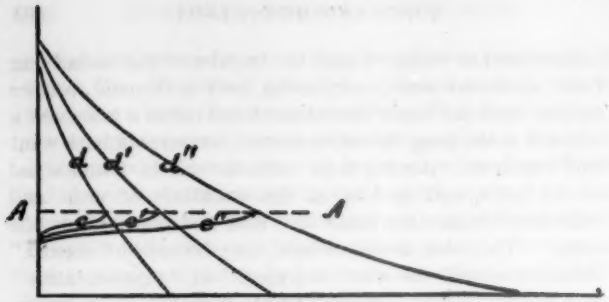

FIGURE 1.

The only difference for an actual society would be that it would cross the demand curves always at the same level, but would extend a short distance beyond them to allow for firms producing at a loss, thus:

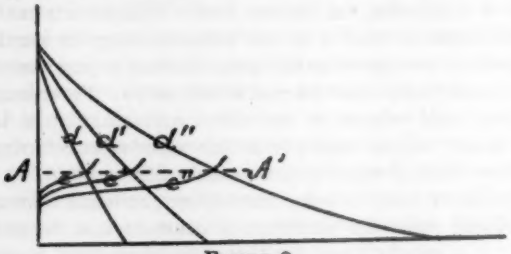

FIGURE 2.

In the case of decreasing cost there would be a series of cost curves crossing the successive demand curves at progressively lower levels as the demand increased, thus:

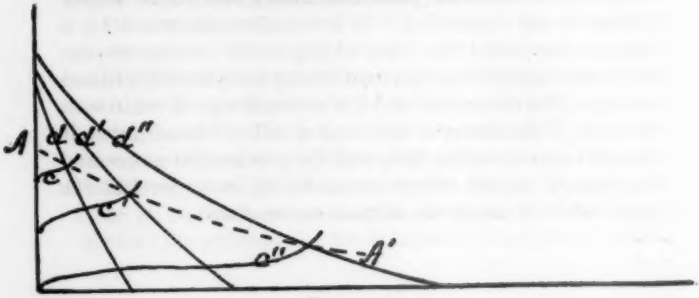

FIGURE 3.

In all the above diagrams, d, d′, d″ are demand curves; c, c′, c″ are cost curves. AA′ shows the levels at which the cost curves meet or cross the demand curves as demand increases, in Figs. 1 and 2 under conditions of constant cost, in Fig. 3 under conditions of decreasing cost.

It was stated that when we so amend the marginal cost theory as to make the marginal cost no longer the highest cost but an intermediate cost, we seem to have rendered the whole theory valueless for practical purposes as a means of determing normal price. Now it is sometimes desirable to determine normal price independently of market price, especially when the latter differs widely from it, as it may in time of war or financial panic. It is also desirable to ascertain normal price when the problem of government regulation of prices calls for solution. In such cases the difficulty referred to may be met by applying the following method.

On the principle of statistical constancy it would seem to be a legitimate assumption, in the case of a large and well-established industry, that, in normal times, about the same percentage of the entire output will be produced at a loss. Having ascertained from cost and price data, collected preferably by a government agency through a series of years, what this percentage is, we can, for the year under study, subtract this percentage from the total output and note what is the highest cost among the costs at which the remaining portion of the output is produced. This cost we may call the marginal cost and consider the normal price as being equal to it.

For example, in a certain region where a considerable portion of the United States supply of sugar is produced, it would appear from pre-war statistics that in normal times about 3 per cent of the output is annually produced at a loss. In the year 1916–17 when an abnormal relation between supply and demand had been brought about by the war, but before government regulation of prices had been attempted, it was found that 97 per cent of the output was produced at a cost not greater than $92.00 per ton, which may accordingly be regarded as the marginal cost or normal price for that year.

The actual price was $124.56 or $32.56 above normal. In the following year, 1917–18, when the price had been regulated by voluntary agreement with the United States Food Administration, the normal price, computed by the same method, would have been $147.00. The actual price was $120.00, or $27.00 below normal.

In connection with the above analysis the writer wishes to emphasize the importance of statistical inquiry as a means of checking and extending economic theory. From the examination of a considerable number of cost curves similar to those shown in Dr. Taussig's article, he was struck with the remarkable family resemblance, whether they were derived from industries to which the law of diminishing returns would presumably apply or not. In all of them there was the same ascending ogee curve, sometimes steep, sometimes more nearly horizontal, but always a curve of the same family type, and in all cases, where the data were at all complete, crossed by the average-price line near its right hand extremity. This unexpected result led him to question whether competition, in the case of industries not subject to the law of diminishing returns, tended to result in a uniform cost for all producers to nearly so great an extent as had been generally supposed, and further led him to question whether there might not be more truth in Walker's theory of marginal and infra-marginal entrepreneurs than recent economists had been willing to admit. Further reflection made it clear that there was no real difference between Walker's theory of the marginal entrepreneur and Marshall's theory of the representative firm. Finally a promising method of handling statistics so as to determine marginal cost and normal price was developed as a result of such theorizing.

It is not the purpose of this article to assert that such cost lines as have been described will be found to exist for all industries. Some industries may be found for which the cost lines are horizontal or approximately horizontal, and in that case it would be interesting to investigate and compare with a view

to determining what are the factors which result in horizontal cost lines for some industries and ascending cost lines for others. Such an investigation would undoubtedly result in a further development and clarification of theory.

PHILIP G. WRIGHT.

AN EMINENT ECONOMIST CONFUSED

THE writer of this note has recently had called to his attention Professor Carver's new and interesting *Principles of Political Economy*. With much that is unusually clear and convincing, it is regrettable to find a vaguely stated and doubtfully valid argument that a protective tariff may add to a nation's wealth by drawing labor out of a line which its employers deem more profitable (under free trade) into one which yields its employers less. Professor Carver's argument, in its most concrete statement, is as follows:[1] "Let us suppose that a certain tract of land had been devoted to cultivation of a fairly intensive kind, and had been producing enough to pay the wages of twenty laborers, with something left over for rent. Through some change of circumstance the price of wool rises, and it is found more profitable to use the land for wool-growing. By turning the land into a sheep run, nineteen of the laborers may be dispensed with, and the saving in wages would more than measure the difference between the value of the wool crop and that of the present crop, so that a larger surplus would be left over as rent. There is little doubt that the land would then be devoted to the growing of wool. That would be to the interest of the landlord and against the interests of the nineteen laborers, but the landlord is in a better position than they to determine the form of cultivation. There is also little doubt that this would be contrary to the interest of the community. Less would be pro-

[1] Principles of Political Economy, p. 360.

duced either for consumption or for international trade. Fewer people could be supported, or the same number would not be as well supported as formerly.

"If the nineteen men thrown out of employment cannot find places elsewhere, they will probably, since they want to live, offer their labor at lower wages — enough lower to enable the landlord to get as much rent from the more intensive form of cultivation as he might get by the less intensive form. Here we have the somewhat anomalous situation of an increase in price in one of the products of industry causing a fall in the price of labor. The key to this anomaly is found in the fact that what is cost to one man is frequently gain to another. Now in this supposed case (which is not altogether a supposed case) there is little doubt that some form of discrimination in favor of the present crop and against wool would increase not only the relative share of the produce going to labor, but the absolute amount of the produce of the land. . . . There lies the opportunity for the protectionist. By some discrimination which will tend to increase the profitableness of the intensive product, or decrease, relatively at least, the profitableness of the extensive product, an absolutely larger and more valuable product might be created. . . . Labor and capital would have been attracted from the less productive to the more productive industry."

The answer which first suggests itself and which the present writer ventured to make some years ago [1] to Professor Carver's argument as it appeared in an article of 1902,[2] is that there are, with reference to the nineteen men who, it is alleged, might be thrown out of work by free trade, two possibilities. Either these nineteen men have a preferable alternative, under the free trade régime, to wheat raising, or they have not. If they have not, they will accept low enough wages, rather than be unemployed and have nothing, so that

[1] See Principles of Commerce, Pt. II, pp. 107–108, note, where Sedgwick and Edgeworth are also criticised for essentially the same error. The writer has since learned that his point was anticipated in a criticism of Sedgwick by Davenport, in the latter's Outlines of Economic Theory, New York (Macmillan), 1896, pp. 197–200.

[2] Publications of the American Economic Association, 3d series, vol. iii, pp. 176–182.

the landowner can realize as much rent for his land as if he used it for a sheep run. Unless their efficiency is thus impaired, they will then produce as much wheat as if they were protected. The effect of freedom from restriction may mean, in this special type of case, lower wages and higher rent, but not decreased national wealth. If, however, the nineteen men have a preferable alternative, they will not raise wheat but will occupy themselves otherwise at higher wages than wheat raising under free trade would yield them, while the landowner will at the same time realize the higher rent assumed to result from using his land as a sheep run. Free trade would then *raise rent more than it would lower wages.*

There is, however, another aspect of the case, which the writer cannot but believe Professor Carver had in mind, tho it seems not to be clearly stated. This is that protection may be one way — not, however, the best or most economical way — of increasing the sum total of utilities. Thus, the wool may be a more profitable product for the landowner only because the class which buys wool is richer than the class which would buy the wheat, and not because it ministers to so important a human want but even in spite of the fact that it satisfies a less intense want. If this is the case, then to divert industry from wool production to wheat production will tend to *increase utilities* whether it decreases values or not.[1] No one should know better than Professor Carver, however, that the best way to remedy the evils flowing from unequal distribution of riches, is not to attempt to discriminate against certain goods as such in the hope of making those goods relatively scarce and hard to get for both rich and poor, while encouraging the production of goods which, in the legislator's view, are most needed by the poor. This is a curiously roundabout and a relatively ineffective and uneconomical method of securing results which can be far more satisfactorily secured by directly taxing those whose incomes are large. It is particularly desirable to do this where these large incomes represent no service

[1] Protection has effects on the distribution of gold and on relative price levels which it is not necessary to consider in the present discussion.

given by the recipients to those from whom they are drawn, as is the case with most of site rent. It is the more surprising that Professor Carver did not call attention to this point since he so clearly favors increased taxes on unearned incomes, and since he advocates increased taxes on land as such (not merely, it appears, on future increases in its value), and on inheritances, as part of his "liberalist's program."[1] Indeed, if a few more economists of Professor Carver's reputation should so frankly advocate land-value taxation, it might almost be possible for younger economists to class themselves as, fundamentally, single-tax sympathizers without thereby losing caste within the profession.

H. G. Brown.

University of Missouri.

A REJOINDER

In case the nineteen laborers decided to accept lower wages and continue growing wheat, there need not be, as Professor Brown points out, any diminution in the total product. The result would simply be lower wages, higher rent, and the same total product as before. This is in agreement with my argument as previously published.

In case, however, the nineteen laborers decide to enter some other calling it must, of course, be a somewhat more remunerative one than wheat growing under the new conditions. It could not, however, be so remunerative as wheat growing had been under the earlier conditions before the assumed rise in the price of wool, otherwise they would not have been growing wheat in preference to following this new occupation. In short, their wages are somewhat reduced by the enforced change as compared with what they were formerly getting, but not so much reduced as they would be if they had no alternative employment but were compelled to con-

[1] Pp. 583–584.

tinue growing wheat at such wages as would leave the land owner as high rent as he might get by turning his land into sheep pasture. When this alternative occupation is open, the changes assumed would raise rent and reduce wages somewhat, but not so much as in the other case.

Will these changes, as Professor Brown says, raise rent *more* than they will lower wages? Yes, if we are thinking of world economy; not necessarily if we are thinking of national economy. In order to find a satisfactory alternative employment, the nineteen laborers may emigrate. In case they do, the national product will obviously be reduced, and will support a smaller population, tho the landowner's rent would be slightly increased. From the standpoint of world economy, the increase of the total productivity of industry is probably not among the theoretical possibilities of protectionism. From the standpoint of national economy, it is. The protectionist is, rightly or wrongly, commonly a nationalist; and from his point of view he finds here at least a theoretical possibility.

T. N. CARVER.

HARVARD UNIVERSITY.

A RE-REJOINDER

IN my criticism of Professor Carver's book, I assumed the alternative industries into which labor would go in case wheat production were abandoned, to be alternative industries *in the same country*. But if, in the supposed case (admittedly, of course, seldom realized) of landowners profiting at the expense of laborers because of free trade, the laborers emigrate, then it is entirely correct to say, as Professor Carver does say, that free trade would diminish *total* national wealth. It deserves to be pointed out, however (and I presume Professor Carver will agree with me in this) that free trade would even then increase the *per capita* wealth of the country in question. It would fail to do this, in a mathematical sense, in one contin-

gency. The average incomes of landowners might be so low and wages so high, that for the wage-earning class to emigrate would leave the average incomes of the landowners and the few remaining laborers lower than the average of the landowners and the more highly paid wage earners had been under protection (altho higher than the average of these same persons's incomes had been). But in any case, the nationalist has the alternative of keeping the home population large and the home production the highest by taxing land rent directly and maintaining free trade, as contrasted with attacking land rent indirectly, uneconomically, and very partially through protection. I trust that these conclusions are consistent with those of Professor Carver as he now states them.

H. G. Brown.

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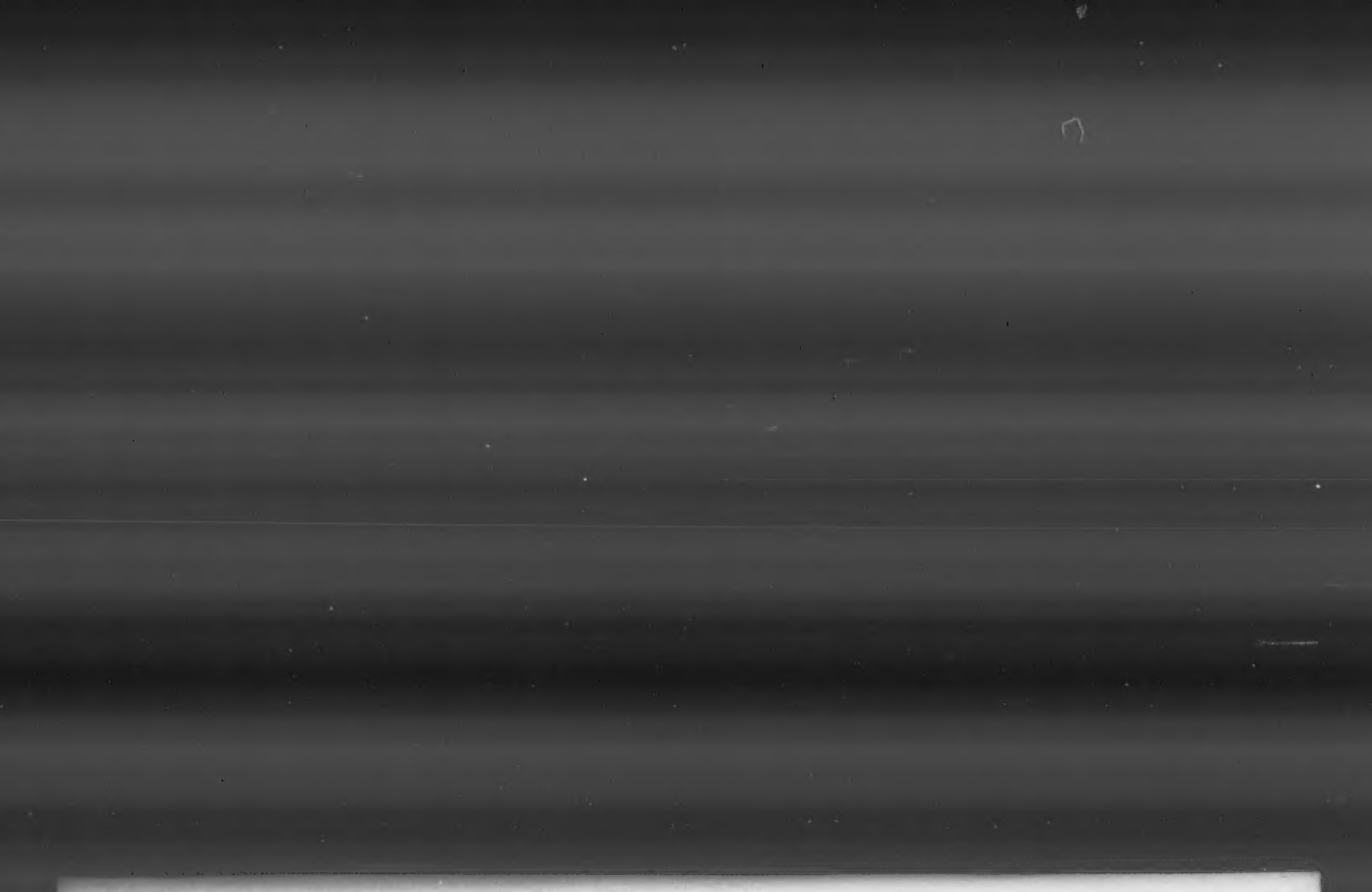
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